



FRIDAY, OCTOBER 26, 1900.

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Contributions

Acceptance Tests for Locomotives.

TO THE EDITOR OF THE RAILROAD GAZETTE.

In a communication, "Acceptance Tests for Locomotives," published in your issue of last week, you have probably expressed the wish of many managers. In the opinion of the writer, the only reason that a systematic acceptance test has not, long since, been inaugurated along the lines set forth by your correspondent "M. E.," is because of the apparent immensity of the task of testing locomotives in large numbers, when the work is thought of as being concentrated upon a testing plant. There is no practical reason apparent why the work of preliminary running may not be well done on a suitably equipped testing plant; the necessary technical confirmation of the design be obtained; the mechanical correctness of operation be established to a reasonable degree and the entire work be done for less money than is now spent in the usual way of breaking in locomotives. There is money for the railroad companies in your correspondent's letter, although department heads may not at first be willing to concede this. For the locomotive builder there can be no hardship involved by such proceedings—rather the reverse—as it would give him opportunity to correct defects which he now sometimes sends high-priced mechanics hundreds of miles to discuss or remedy. Locomotive builders could well afford to establish the necessary plants or to arrange for the use of them. Railroad companies could quite as well afford to pay a part or even the whole of the cost of testing. The sum total of expenses of a day or two of roundhouse and yard breaking in of an engine; a delay or two on the road; a cellar or two full of babbitt, and in all a few days lost out of the first month of service will cover well all cost entailed by the suggestions of your correspondent. His specifications of test would necessarily be subject to a closer rendering after some revision.

Paragraphs three, four and five of the body of your correspondent's letter contain matter for congratulation. He has evidently "been there," or he has close friends at court. Within the scope of the matter there written, bitter contentions have gone on for months, at great daily financial loss. A single positive demonstration of fitness is usually the beginning of the speedy end of such trouble, but when a new class of engine is sent out to revolutionize time-honored routine it is not commonly welcomed enthusiastically on the line. It is easy to be fog on the main issue and to prolong the confusion and loss if nothing more definite than calculations are at hand with which to close roundhouse and yard arguments. Certainly the locomotive is there, but a new locomotive, perhaps instinctively and unreasonably disliked, is as a horse without a pedigree, his metal yet to be proved. The obtaining of an established record for a locomotive under such conditions, if it is to be relied upon by those who designed or built the engine, is exceedingly difficult.

Based upon these observations, and many more in detail that cannot enter here, the answer to your correspondent's question "Is it not now time, etc?" would be "It is time?"

D. L.

Superintendents of Bridges and Buildings.

The tenth annual meeting of the Association of Railway Superintendents of Bridges and Buildings was held at the Southern Hotel, St. Louis, Mo., beginning Tuesday morning, Oct. 16. About forty members were present and five applicants were admitted to membership. The Secretary reported a total membership of 146, and the balance on hand in the treasury is \$1,048. The subjects reported on last year were first called up for further discussion.

Of Bridge Painting it was said that about two-thirds of the total cost of this work is for cleaning the structure and the remainder is for painting. A few had used the sand blast for cleaning with good results, and this is evidently a thing which will receive considerable attention in the future. With the sand blast the metal is thoroughly cleaned, but whether this method can be used to advantage probably depends a good deal on the size of the job. However, the introduction of portable air compressors driven by gasoline engines promises to make possible a good deal of this kind of cleaning, also the use of painting machines on many classes of work, as well as pneumatic riveting and drilling when re-inforcing old and erecting new steel structures.

Under the heading of Timber for Bridges, Mr. W. A. McGonagle, Duluth & Iron Range, said that as the end bents of pile trestles are the first to fail, that road makes a practice of using cedar piles for the three end bents when cedar piles cannot be got for the entire bridge. A number of others spoke of the long life of cedar piles, but it is difficult to get them of sufficient size and length; also cedar piles are not so strong as oak piles. In reply to a question as to the advisability of driving piles with the butt ends down, Mr. J. H. Cummins said the Long Island R. R. had tried this, and it was not a good practice.

In discussing Highway Crossings, Mr. McGonagle suggested that plates of corrugated pressed steel, or cast-iron, might be more suitable than wooden planks, being more in the nature of permanent construction. Also they would have the further advantage of being easily taken up when it was necessary to do track work at crossings. None of those present knew much of such metal plates being used, but possibly something of this kind has been tried.

As one means for preventing Fires on Long Trestles, Mr. W. M. Clark, Pittsburgh & Western, said that their freight engines were so equipped that the enginemen by opening a cock could spray water over bridges in passing. This spraying apparatus was used in dry weather.

The reports of committees were then read and discussed and the following is an abstract of the reports and discussion.

Tools for a Gang of Bridge Men.—Committee: Chairman, W. S. Danes, Wabash; J. M. Staten, Chesapeake & Ohio; W. O. Eggleston, Chicago & Erie, and J. M. Caldwell, Chicago, Indianapolis & Louisville.

This report contains a long list of tools for bridge work, which is not reproduced. In the discussion a number considered that the outfit was rather more complete than was absolutely necessary, but that with such an outfit a bridge gang would be very well equipped.

Snow Fences, Stationary and Portable.—Committee: Chairman, W. E. Smith, Chicago, Milwaukee & St. Paul; A. McNab, Chicago & West Michigan; Geo. E. Hanks, Pere Marquette; A. W. Merrick, Chicago & Northwestern, and W. M. Noon, Duluth, South Shore & Atlantic.

Of the stationary fences, the kind used most is the common high board fence. It is modified in height, sizes of material, and style of construction to suit the location and the judgment of the builder. For want of better material or in the interest of economy, fences are sometimes made by standing old track ties or bridge ties on end tight together in the ground, or by building a rail fence with them. On the prairies of Western Minnesota and in the Dakotas, especially where the land adjoining right of way is unimproved, sod walls are built 4 or 5 ft. high to serve as snow fence. In the location just named snow drifts are almost always frozen hard as fast as they form, and it is common practice there to build walls of cakes of snow, and when a drift has formed as high as the wall add another wall to the top of the drift and continue to do this as the drift rises higher. Our most common forms of portable fences are often placed on top of drifts and staked down until the drift rises above them, when they are again placed on top. It is our opinion that where hedges may be planted 100 ft. or more back from a cut, they are a most desirable fence. Or where a low hedge, say 5 or 6 ft. high, will be sufficient protection, it may be planted on the right of way line which is ordinarily 50 ft. from center of track, but if neglected hedges become a nuisance. Although so dense generally, the foliage of old or overgrown hedges is too sparse near the ground to prevent wind from carrying snow under. This trouble may be obviated by building a low board fence behind them. To maintain hedges properly for many years it requires considerable watchfulness and systematic care to keep them trimmed and well protected from fire.

The most common form of portable fence in use is the board panels 16 ft. long and 8 ft. high made of ordinary 1 x 6 x 16 ft. fence boards nailed to three 2-in. x 6-in. x 6 ft. and three 2-in. x 6-in. x 8 ft. post or legs. These legs are in pairs of one 6-ft. and one 8-ft. piece with their feet spread 5 ft. apart and their tops crossed 5½ ft. above the foot of the legs and fastened with one screw bolt through them which serves as a hinge when the panels are closed up to be piled away for the summer. There is a pair of these legs in the middle and one near each end

of the panel, the foot of the long legs standing toward the cut and those of the shorter legs away from the cut when fence is in position. The tops of the long legs overhang the intersection 2 ft. to windward, and have three boards on the under side of this projection to catch the wind as it glances up from the main part of the panel which has seven boards and two bracing cleats on the windward side of the short legs. The spacing of the boards varies from 5 in. at the bottom to 2 in. at the top of the fence. These panels stand end to end in a fence, but are independent of each other, being fastened only to the ground by nailing the base of the legs to short wooden stakes driven in the ground before it freezes or into frozen snow drifts. When the ground is frozen, they are fastened with staples to ordinary iron drift bolts used as stakes.

This style of fence has been in use on the Chicago, Milwaukee & St. Paul since 1880. It is still the standard portable fence, and cost in 1899 f. o. b. cars \$1.59 per panel, complete with stakes and spikes, each panel weighing 327 lbs. when made of green lumber. Many miles of it were built that year on forms faced with iron for clinching the nails. This style of fence is also the standard portable fence on the Union Pacific and the Colorado & Southern, and is used on the Lehigh Valley railroad.

It may be mentioned here that sloping the banks of shallow cuts well back, say 1 ft. in 10, will, in many cases, remove the necessity for a snow fence. This is being done by some roads, which also miss no opportunity to widen troublesome deep cuts, when material is needed elsewhere for filling purposes, in such a manner as to make more room in them for drifting snow.

To save the time, annoyance, and cost of dickering with owners of adjoining property for the privilege of locating fence on their land, it should be located on our own land whenever practicable; and where there is no objection to having the fence stand the year around it should be a stationary fence, this being the most durable and economical kind to maintain; and one that will serve for a property line fence at the same time. The fence should be placed 60 to 75 ft. from the track if we own that much land. The worse the snow drifts, and the nearer the fence is to the track, the higher and tighter it should be. When the stationary fence will not hold all the snow that comes, another line of fence and sometimes three or four lines are put up farther away from the cut, at intervals of 100 to 200 ft. apart, one at a time as needed. These extra lines are usually portable for the reason that railroad land seldom extends that far, and the fences if on improved land must be removed during the summer. The panels are folded and laid in piles several feet high on the right of way and protected from prairie fires in the summer by section men burning the grass off the ground for some distance around them.

The most interesting part of the discussion was a statement by Mr. B. F. Pickering, of the Boston & Maine, with reference to the short wing fences which have been used on certain parts of that road, being placed in cuts at an acute angle with the track. The idea was that, where the prevailing wind is nearly parallel with the track, these fences would divert the wind sufficiently to prevent drifts forming on the track. But as a matter of fact they do not do what was expected. Instead of one large soft drift forming, a drift is formed opposite each wing fence which is from 2 to 4 ft. deep and of very hard snow, almost like ice. These small compact drifts are worse than the one large drift of soft snow, and these wing fences are being taken down. The direction of the wind at the best is so variable that these fences cannot be at the proper angle to the track for any great part of the time. It was the general opinion that stationary fences are preferable to portable fences, and that it is cheaper to build and maintain fixed fences than to clear the tracks after each heavy snow storm.

Best Method of Erecting Track Scales; Suspended or Under Track.—Committee: Chairman, H. D. Cleave-land, Pittsburgh, Bessemer & Lake Erie; Wm. M. Clark, Pittsburgh & Western; C. P. Austin, Boston & Maine, and J. T. McIlwaine, Cleveland Terminal Valley.

Nineteen answers were received to a circular letter, of which the following is a summary: Ten use the Fairbanks as standard scales; two, the Buffalo; one, the Howe, and two make their own scales. Twelve are in favor of the deck scale, and one in favor of a suspended scale. Twelve are in favor of using the dead rail, and two not in favor of using it. Four are in favor of long stands, and four in favor of short dead rail stands. Two use brick foundations; nine, stone; one, piling, and one concrete. Two test their scales every month; two, every two months; one, every three months; two, every six months, and three, once a year. Six use a car for testing, and four use four-ton weights.

The opinion of the Committee is, that if more of the members had had experience with suspended scales, they would have more friends. It took pains to go and examine a first-class suspended scale. In its favor the Committee found there was no chance of freezing, less friction to wear bearings, and if properly housed in, no chance of rust or corroding, and no chance of settlement in the foundation. To offset this is the extra room for erecting a building, and the additional first cost. It differs with some of the members relative to using the long dead rail stand, as the longer the stand, the more leverage the load has in passing over the scales. The long stands are more apt to break, and you have to use bridle rods to keep them from spreading, which is thought to be a detriment. Where the dead rail is used, the Committee would recommend having the dead rail the straight rail, so they will have to throw the switch to get on to the scale rail. The

Committee would also suggest the advisability of testing scales more often than some of the roads do; in its judgment scales should be tested at least once a month, whether or not any business is done, and scales at harbors and terminal points, or any scales that are used constantly, should be tested even oftener than that. Some private firms test their scales every Monday morning.

terminated from the amounts of sand and stone in the gravel.

Portland cement concrete is used for all classes of masonry where exposed to the weather or for foundations requiring great strength. The proportions of materials used in making Portland cement concrete vary greatly as shown by Table I.

TABLE I.—PROPORTIONS OF MATERIALS USED IN MAKING PORTLAND CEMENT CONCRETE.

Class of Work.	No. of users.	Parts of				Remarks.
		Cement.	Sand.	Gravel.	Broken stone.	
Class I. 1 cement to 1 sand.	1	1	1	2 (of size 1-16" to 3/4")		
Class II. 1 cement to 2 sand.	1	1	1	2		
Copings and bridge seats.....	1	1	1	2		
Bearing blocks and parts receiving direct pressure from superstructure.....	1	1	1	2		
Arches, coping, bridge seats and pedestal stones..	1	1	1	2		
Facing old masonry.....	1	1	1	2		
Wet foundations.....	1	1	1	2		
Foundations.....	1	1	1	2		
Elevator foundation.....	1	1	1	2		
Head walls and coping.....	1	1	1	2		
Used under water.....	1	1	1	2		
Piers, abutments, and foundations where loading is excessive or water bad.....	1	1	1	2		
Foundations.....	1	1	1	2		
Dry foundations.....	1	1	1	2		
Class III. 1 cement to 2 1/2 sand.	1	1	1	2 1/2		
Neatwork, arch rings, parapets.....	1	1	1	2 1/2		
Class IV. 1 cement to 3 sand.	1	1	1	3		
Outside shell and coping.....	1	1	1	3		
One elevator foundation.....	1	1	1	3		
Foundations.....	1	1	1	3		
Neatwork.....	1	1	1	3		
Body of piers and culverts.....	1	1	1	3		
Cylinder piers and floors.....	1	1	1	3		
Foundations, piers, and abutments.....	1	1	1	3		
Foundations.....	1	1	1	3		
Footings and abutments.....	1	1	1	3		
Piers.....	1	1	1	3		
Ordinary wet foundations and culverts.....	1	1	1	3		
Class V. 1 cement to 3 1/2 sand.	1	1	1	3 1/2		
Foundations light buildings.....	1	1	1	3 1/2		
Culverts.....	1	1	1	3 1/2		
Class VI. 1 cement to 4 sand.	1	1	1	4		
Foundations light buildings.....	1	1	1	4		
Footings.....	1	1	1	4		
Building foundations.....	1	1	1	4		

The Committee would also recommend using a test car instead of weights, as the scales may weigh a light load correctly, and have quite a variation in a heavy load. This is especially true if the bearings of the scales are dull. Mr. W. M. Clark, Pittsburgh & Western, said he was an advocate of suspended track scales. With deck scales much trouble is experienced in freezing weather by ice forming and causing the platform to bind. But the most serious objection is that the bearing points of deck scales wear rapidly, and when this occurs it is impossible to adjust the scales to weigh correctly. The wear is principally caused by the scales shifting when cars are pushed on or off. This trouble is not experienced with suspended scales, as in that case the scales are mounted above on a heavy frame work, and the platform carrying the rails is connected to the weighing apparatus by rods from 22 to 24 ft. long. With these long rods, any swing of the platform does not cause a shifting on the bearing points. The suspended scales are more expensive to instal, requiring a good foundation and a heavy frame which is housed in, while the floor below the weighing apparatus must be ceiled tight to prevent fumes from locomotives injuring the apparatus. Four ventilators should extend from below the ceiling up through the roof. Suspended scales cannot be put on main tracks, but it is held that this is no objection, as track scales should never be so placed. Mr. Clark thinks that scale tracks should be short, so they cannot be used for storing cars, with not more than 30 ft. of tangent on either side of the scales; there should be a descending grade either way from the scales.

Concrete for Bridge Piers and Abutments and Railroad Culverts and Arches.—W. A. Rogers, Chicago, Milwaukee & St. Paul.

This report is a summary of a large number of replies to a circular letter, the information coming from the principal roads in all parts of the country. It is doubtless one of the most valuable papers published on the subject, very full extracts from letters being put in the form of an appendix. What follows is taken from the summary:

Thirty-nine out of 42 replying state that they use cement concrete for building foundations, retaining walls, dams, culverts, bridge piers or abutments and similar structures. In this work Portland cement is chiefly used and the best practice is to use natural cement only for foundations and other work, wholly before ground, or where it is not exposed to the weather. The proportions of materials used in making natural cement concrete vary from 1 part of cement to 1 1/2 parts of sand to 3 1/2 parts of broken stone; to 1 part of cement to 3 parts of sand, to 5 parts of broken stone. Gravel is often used in place of broken stone when the proportions have to be de-

One of those reporting, states that he selects a mortar strong enough for the particular purpose and supplies enough stone to make the voids in the same not quite equal to the mortar, and that one to three mortar is ordinarily satisfactory. Another uses for bridge seats or copings, which are to carry pedestals for long span girders, one part of cement to two parts of fine granite screenings to three parts of coarse granite screenings not over 3/4 in. in size. The great variation in proportions of materials used for making the same classes of structures would indicate that this feature of concrete construction is a fruitful subject for investigation and experiment. While undoubtedly part of the wide variation is due to the different quality of the materials used, especially that of the sand and broken stone, yet this will only account for a small part. It is our individual opinion that the proper procedure is by careful study and experiment to determine the cement-sand mixture giving the requisite strength for the work in hand, and then to add broken stone in such quantity that the mortar will be slightly in excess of the voids in the stone. Experiments on the compressive and tensile strength of concrete have indicated that the strength depends primarily on the cement and sand mixture provided the mortar is not exceeded by the voids in the stone, and that the greatest strength is obtained when the mortar is only slightly in excess of the voids. On the subject of the proper proportion is dependent not only the economy but also the success of this form of masonry.

Of the 25 giving their requirements as to the sand used, 21 say that it shall be clean, one that it shall be moderately clean, 21 that it shall be sharp, and 1 that it shall be sharp lake sand, 11 that it shall be coarse, and one that it shall be rather fine, 2 that it shall be siliceous, two require that it shall not contain more than 1/2 per cent. of loam, clay, or earth, 1 specifies that wherever possible it shall be free from mica and sand, that containing more than 5 per cent. of these ingredients is rejected, 1 requires that it shall be hard, one that the grains shall be of varied sizes, 2 that it shall be free from pebbles over 1/4 in. in size, 1 that none shall pass a No. 30 sieve, and 1 that not to exceed 12 1/2 per cent. shall pass a No. 80 sieve, and not more than 50 per cent. a No. 50 sieve.

Of the 11 giving their requirements for gravel, 6 specify that it shall be clean, 1 moderately clean, 2 hard, 2 sharp, 1 that the sand grains shall be coarse and sharp, 2 that it shall pass a 2-in. ring, 1 that it shall vary from 1/4 in. to 2 in., and 1 from 1/4 in. to 2 1/2 in., 1 that no pebbles shall be over 2 1/2 in., and that pebbles between 1/4 in. and 2 1/2 in. shall not exceed one-third of the total volume; 1 that it shall be of small size with no pebbles larger than hickory nuts, 1 that the particles shall be oblong and irregular in shape rather than round if possible to obtain it; and 1 specifies ordinary pit gravel thoroughly washed.

Twenty-six gave their requirements as to broken stone as follows:

Requirements for Broken Stone.

No. specifying.	Requirements.
13	Clean and free from foreign matter.
7	Hard.
5	Of sound stone.
3	Limestone.
1	Trap rock, quartzite, or fine grained limestone, or other equally compact stone.
2	Angular.
1	Durable.
1	May range in size from smallest angular fragment to 5" largest way, provided not more than half the pieces are full 5" longest dimension, and must pass 2 1/2" ring.
11	Must pass through 2 1/2" ring.
7	Must pass through 2" ring.
1	Must pass through 1 1/2" ring.
1	Unscreened if screenings are clean.
1	Not less than 1/4", 80% to pass 2" ring and balance 3" ring.
1	Unscreened where screenings are hard and sharp. Otherwise, must pass through 2 1/2" screen and be held on 1/4" screen.
1	Prefers screened to assorted sizes. Part as large as 5" cube, part to pass 2 1/2" or 3" ring, part 1/4" ring, and part 1/8" ring, balance to be used as sand. Objects to crusher run, on account of separation of finer particles and variation of composition.
12	Crusher run.
1	Screened.
1	Stone from 1/4" to 2" for footings and abutments, and 1-16" to 3/4" for copings, bridge seats, and facing old masonry.
2	Flat pieces not allowed.
1	Has used slag.
1	Has used slag in foundation with natural cement successfully.

"Do you prefer a dry, moderately wet, or wet mixture? By dry mixture is meant one which requires repeated ramming to bring water to the surface; by wet mixture is meant one which quakes when slightly rammed."

The opinions as to the proper practice to be followed in this respect are quite evenly divided between the advocates of the dry and of the wet mixtures. Ten prefer a dry mixture. Five prefer a moderately dry mixture. Sixteen prefer a moderately wet mixture. Four prefer a wet mixture. One qualifies his statement that he prefers a moderately dry mixture by saying that observation of large masses of wet concrete inclines to the belief that it brings entirely safe and satisfactory results. Another who prefers a moderately wet mixture describes the degree of wetness as follows: "Such a state that it will not quake under heavy ramming, but will by the addition of a very small quantity of water. Too dry is more dangerous than wet." Another who requires a dry mixture states that the amount of water used shall equal about 25 per cent. of the volume of the neat cement. Another prefers a moderately dry mixture although it is more difficult to get good results.

"Have you experienced any trouble on account of cracks forming between successive layers of concrete, especially when one layer has been placed after the one below has started to set? What method have you adopted to obviate this difficulty?"

The methods adopted to prevent this difficulty are quite similar and consist generally in having the top surface of the layer of concrete, which has set, clean, rough, and wet. In addition in one instance the next layer of concrete is made a little wetter, three sprinkle a small amount of pure cement on the wet top surface, another uses a slight excess of mortar in the next layer, and another sprinkles a thin grout over the surface of the layer which has set, and if the location is such that a crack would weaken, iron dowels are placed in the top or stones up to one cubic foot in volume are placed in the top layer with one-half of the stone projecting above the surface, or a groove is formed in the top of the layer by setting a plank with its top level with the top of the layer in the concrete before it sets. In any case a stoppage of work within 18 in. of the top of a wall is prohibited by him.

"What, if any provisions, do you make for expansion and contraction due to changes of temperature?"

Fourteen out of 25 make no provision whatever for expansion and contraction due to changes of temperature. One makes no provision now, but would if called upon to build a long wall. The general plan followed by the others is to provide planes of weakness or cleavage lines in the wall or other structure from 10 ft. to 75 ft. apart.

"Do you face concrete exposed to the weather? Please describe the facing used and method of putting it on, and say if you have had any trouble with its cracking off."

Fourteen of the 27 replying to this question do, and 13 do not use mortar facing for concrete work exposed to the weather. There is considerable dissimilarity in the form of facing used and the methods of applying it. Below are given the different proportions of cement and sand used in making facing, one person only reporting in each case:

- One cement to 1 sand.
 - One cement to 1 sand, 3 in. or 4 in. thick.
 - One cement to 2 sand.
 - One cement to 2 sand, 1 in. thick.
 - One cement to 2 sand, 1 1/2 in. thick.
 - One cement to 3 sand, 2 in. thick.
 - One cement to 3 sand, 4 in. thick.
 - One cement to 3 sand, 6 in. thick and 1/2 in. of neat cement on the outside.
 - One cement to 4 sand.
 - Portland cement mortar facing, 6 in. thick.
- The unanimous reply of those using mortar facing is, that they have experienced no trouble on account of its separating from the body of the concrete. One of those

who only uses mortar facing in special cases has had trouble with Portland cement facing separating from natural cement concrete.

One whose work is rarely exposed to temperature below 20 deg. above zero Fahr. plasters the facing on successfully. Another plasters board form before putting the concrete on the inside and at other times piles the concrete a short distance from the form and then fills this space with grout. Another method used is to put the mortar facing against the form and then to throw the concrete against it; after removing the form a thin 1 to 2 mortar is then applied and rubbed down with a cork float, making a neat sand finish. Another is to plaster the mortar on the inside of the form and ram the concrete against it. Another places a 6-in. board 4 in. from the form and fills concrete back of it and then rams it. He then places mortar in the 4-in. space, after which it is again tamped. Another method used is to have an iron or steel plate 4 ft. to 6 ft. long, of a width equal to that of the course desired. On one edge of this plate two handles are placed and on one side two angles are riveted at right angles to the length of the plate. These angles are of such a size that when the plate is placed with the angles against the form the distance between the plate and form equals the thickness desired. The plate is placed as just described, the concrete is filled back of it, and the mortar between it and the form. Then the plate is removed and both are tamped together before the initial set has taken place. Others use no mortar facings but get a good surface by placing fine concrete next the mold and ramming carefully; then by using a trowel or spade the coarse materials are worked back from the face.

Of the 28 replies, 17 are more or less unfavorable to the carrying on of concrete construction during freezing weather, 10 are favorable to it with proper precautions and one is unfavorable to the manufacture of natural cement concrete and favorable to the manufacture of Portland cement concrete during this weather. Almost every one qualified his reply. Nineteen reply that they have never seen any injurious effects of frost on Portland cement concrete after it has set, with these qualifications in two instances, "when of good materials," and "if properly put in." One reports that frost caused exposed surfaces to crack and chip off especially if weather alternates between thawing and freezing for any length of time. The committee is of the opinion that the writer of this reply did not understand the question and that he refers to concrete work being carried on in freezing weather. The only other reply giving an unfavorable report on the action of Portland cement concrete during freezing weather after it has set, follows: He states that his observations have not been entirely satisfactory, and that he has noticed flaking from both natural and Portland cement concrete where no facing has been used and crumbling of cement, but states that the latter might be due to poor workmanship or quality of materials.

Practically all of those giving the results of their observation as to the effect of frost on natural cement concrete state that they have observed bad results. The replies analyzed are as follows: Three state that they have observed bad results. One person states that natural cement concrete usually scales and peels off. A second that it is unreliable. Another that he cannot recommend it where subject to the action of frost. Another that if it is not thoroughly dry before frost it will remain soft afterwards even in warm weather. Another states that he has observed natural cement concrete which has been damaged by the action of frost and especially where it is subject to rising and falling water during cold weather. From the tenor of the replies it would seem that the general feeling is against the use of natural cement concrete where subject to the action of frost.

"Please state any reasons you may have for or against the use of concrete in railway bridge or building work."

The replies to this question are as a rule very favorable to the use of concrete, and they are given in a condensed form below without comment on the part of the committee.

Mr. W. H. Kennedy, Chief Engineer Oregon Railway & Navigation Co., states that concrete is perfectly satisfactory and the most economical building material for bridge foundations and culverts to be had on that line.

Mr. A. E. Killam, Inspector of Buildings and Bridges of the Intercolonial Railway of Canada, states that he prefers good stone masonry in their new and permanent structures.

Mr. W. G. Curtis, Engineer Maintenance of Way of the Southern Pacific Co. (Pacific system), stated that he was satisfied with concrete construction made in accordance with their rules, for practically all classes of railroad bridge and construction work involving the use of masonry.

Mr. W. J. Wilgus, Chief Engineer of the New York Central, states that his experience with concrete has been uniformly satisfactory, and that they have found it especially valuable in the preservation of old masonry on the line of that system, which has failed, due to disintegration of the face stones and in some cases for the reinforcing of foundations. He has found concrete especially valuable in the construction of bridge seats in conjunction with the reconstruction of bridges on the four-track line between Buffalo and Albany. This method of construction obviates the use of derricks and other interruptions to traffic incident to the use of stone coping.

Mr. H. W. Parkhurst, Engineer B. & O., Illinois Central, states that concrete is preferable to stone masonry on account of its greater cheapness; the fact that the work can be done without the use of derricks and heavy machinery; that complicated structures can be built by

the aid of molds and that work can be handled in restricted quarters which would be impossible to carry on with cut stone. It has especial advantage in reinforcing cut stone masonry, either bridge piers, arch culverts, abutment walls, parapets, etc., where a mold can be constructed and a good bond made between the old and the new work.

Mr. L. F. Goodale, Chief Engineer of the Hannibal & St. Joseph, gives the advantages of concrete as follows: Convenience, cheapness; the fact that it can be built with unskilled labor and without the use of derricks, and the fact that it can be easily built in almost any shape.

Mr. C. D. Purdon, Assistant Chief Engineer Atchison, Topeka & Santa Fe, is in favor of the use of concrete where placed by experienced men.

Mr. H. D. Cleveland, Master Carpenter of the Pittsburgh, Bessemer & Lake Erie, states that he has never used concrete for abutments as sandstone is so cheap there and he prefers stone to concrete.

Mr. Thos. Rodd, Chief Engineer Pennsylvania Lines West of Pittsburgh, gives the following reasons against the use of concrete in exposed work: Appearance. He prefers dimension stone masonry to concrete on account of the more pleasing appearance of the former. Durability. He believes that concrete disintegrates when exposed in this climate unless built with the best brands of imported cement.

Mr. Charles Churchill, Engineer Maintenance of Way of the Norfolk & Western, states that he should not hesitate to use Portland cement concrete if forced to through the lack of suitable stone for ashlar masonry, but that he regards the latter with good stone much to be preferred when procurable at reasonable prices.

Mr. H. F. White, Chief Engineer Burlington, Cedar Rapids & Northern, states that in the five years' experience he has had with concrete, it has given just as good results as stone masonry.

Mr. G. A. Gould, Superintendent B. & O. of the Chicago, Rock Island & Pacific, states that he considers concrete cheaper and better for all ordinary bridge and building work than any other kind of masonry.

Mr. W. A. Rogers, Engineer Permanent Construction B. & O. Dept., Chicago, Milwaukee & St. Paul, states that during the last three seasons 100,000 cu. yds. of concrete have been placed on that line, and that the results have been very satisfactory. He states the following advantages: No derricks required, less interference with traffic, may be built with unskilled labor, wider distribution of concrete materials, less false work required, permits combination with iron or steel, ease with which structures of irregular and intricate shapes are made, durability, economy, pleasing appearance.

Mr. D. Bontreau, Chief Engineer of the Kansas City, Fort Scott & Memphis, says that an important advantage of concrete is the ability to handle material in places which are difficult of access and in the case of culverts the comparative security against washing out.

Mr. Fred Eilers, Superintendent B. & O., Chicago, Burlington & Quincy, states that concrete has been giving them good satisfaction.

Mr. Thomas H. Johnson, Chief Engineer of the Pittsburgh, Cincinnati, Chicago & St. Louis, states the use of concrete above ground has been too limited and of too recent date to warrant drawing conclusions therefrom.

Mr. J. Woodman, Engineer W. D., Canadian Pacific, says: "It appears to me that there can be no doubt that concrete is, when properly handled, the most suitable and economical material for bridge piers, abutments, railroad culverts, and arches or in buildings."

Mr. E. H. McHenry, Chief Engineer Northern Pacific, gives the following reasons for using concrete: Cheapness; can be built with an experienced foreman and unskilled labor; material is much more easily handled than in stone masonry; results obtained more satisfactory than stone masonry except when built of granite; easily adapted to any form.

Mr. Hunter McDonald, Chief Engineer of the Nashville, Chattanooga & St. Louis, says: "I have no good reason for not using concrete, except that I prefer to see the results of its use in a great many places which I have observed, before risking it on structures exposed to great variations in temperature." He also states that he finds brickwork with natural cement very satisfactory and cheaper than concrete.

In conclusion the Committee wishes to state that representatives of railroads having a mileage of over 85,000 miles state that concrete is being used to a greater or less extent on the lines for which they reported. It is the opinion of the Committee that the reports indicate that its use by railroads is on the increase and that where it is or has been used it has been found to be a suitable and economical form of masonry.

There was a long discussion of concrete masonry, the most interesting points being those brought out by Mr. Rogers in answer to questions. He said that the Chicago, Milwaukee & St. Paul would build this year about 50,000 cu. yds. of concrete which is about the same amount built last year and concrete is thought to be equally as good as stone; being used for a great variety of purposes including the coping and bearings of bridge abutments. As an example of how wide practice varies, a representative of the Chicago & Northwestern said that that road had as yet used no concrete. In using concrete for abutments, piers, etc., the St. Paul uses the same dimensions as though stone were to be used, but this provides a large factor of safety for the concrete. In reply to questions, Mr. Rogers said he thought a good deal more stress was laid on the question of voids in concrete than was war-

ranted. Large voids could be got rid of by using suitable proportions of materials and a wet mixture, the latter being a very important factor. Experiments now under way, leads him to believe that a wet mixture of concrete is the best to use. Also, experiments indicate that clean sharp sand may not always give the strongest concretes and that a small percentage of dirt in the gravel and sand does not affect the strength appreciably. Mr. Rogers thinks that better concrete can be made with the Ransome mixer than by hand, but that he would not use on important work any form of continuous mixer he has seen. The St. Paul now uses only Portland cement concrete for work above ground and the use of a facing has been abandoned. Instead, the concrete is tamped with a spade next to the form just enough to work the stone back from the face. This gives in effect the same result, is equally as good as a facing and is cheaper. Both Mr. Rogers and Mr. A. S. Markley, Chicago & Eastern Illinois, consider that natural cement concrete is not fit to use for work above ground, and further such concrete should not be built in freezing weather. Portland cement concrete can be safely built in cold weather, but there is a possibility that later it will scale and look badly. Mr. A. B. Manning, Missouri, Kansas & Texas, said that they used stones as large as 2 ft. sq. in their concrete work, keeping the large stones back about 6 in. from the face of the work; they try to use about one-half large stones as this lessens the cost of the work. The same road has recently built some small culverts using in the concrete burned clay ballast instead of broken stone. As an example of a novel use of concrete, Mr. Clark, Pittsburgh & Western, said he had put a concrete bottom in an old 50,000-gal. water tank which was leaking badly. The concrete was spread from 6 to 8 in. deep on the bottom and was extended a short distance up the sides, it being allowed to set before water was turned in. After these repairs were made the tank did not leak.

Bumpers for Yard Terminals.—Committee: Chairman, B. F. Pickering, Boston & Maine; A. A. Page, Boston & Maine; W. E. Harwig, Lehigh Valley, and A. E. Killam, Intercolonial Railway.

Replies to a circular letter were received from 24 members, representing 20 different roads. Of these, 17 strongly recommend the Ellis bumper, seven favorably mention a bumper composed of a heap of earth, two speak well of the Haley bumper, two like some form of frame bumper, one sends a blue print of a bumper of his own invention on much the same principle as the Ellis, one favorably mentions a pile bumper, and one prefers to use the Superintendent for that purpose where it is feasible to do so; unless the track is so located that a serious accident would ensue should the cars be pushed off the end of the track. This member believes that it is far better for all concerned to allow the Superintendent's orders to stand for bumpers. Personally, the Committee has used the Ellis, pile, and frame bumpers, and a heap of earth. Where it can be used without attracting unfavorable notice or occupy too much valuable room, it believes the earth is the ideal bumper. But where this cannot be used the Ellis is the best bumper the Committee has seen. But this has some weak points. Especially would it condemn the use of spiral or rubber springs, as the former will break and the latter become useless with age.

The discussion chiefly emphasized the statements in the report, that the Superintendent's orders were very effective in preventing cars from being pushed off the ends of spur tracks and that the bumpers now on the market could be improved. Mr. Pickering said that in his opinion the bumper should offer a yielding resistance so as not to damage cars, which was something that had not yet been provided for. As bearing on this point, we should think that the Westinghouse friction buffer might be used in connection with a car bumping post to good effect. Mr. J. McIntyre, Erie Railroad, said that in addition to the bumping posts mentioned in the report, he had found that a heap of slag enclosed by a row of piles made a good bumper; the rear piles were about 4 ft. above the rail and the slag was sloped off toward the front. Such a post had been in use about six years and was still in place. Mr. Pickering said the bumpers were not always damaged through carelessness or by accident. In several instances of damaged bumpers he had found on investigations that yard men were using the post as a thing to push against to move lumber which had shifted on the car. The bumpers were often used for this purpose, especially when the lumber had been loaded on cars covered with ice.

Tie Plates on Bridges.—Committee: Chairman, C. A. Lichty, Chicago & Northwestern; A. Montzheimer, Chicago & Northwestern; C. W. Vandergrift, Chesapeake & Ohio; H. W. Fletcher, Chicago & Northwestern; F. S. Edinger, Southern Pacific, and J. B. Sheldon, New York, New Haven & Hartford.

Practically all of the members heard from agree that tie plates are a benefit on soft-wood ties, and quite a number favor them on hardwood ties where the bridges come on curves, and where the traffic is heavy. The report from A. S. Markley, Chicago & Eastern Illinois, sums up the matter in concise form: Tie plates put under the rail on part of our bridges where long leaf Southern pine is used for ties have given good results. Tie plates should be used on all bridges where pine ties are used, more particularly where the traffic is heavy and a large amount of switching is done. It is as essential to use tie plates under such conditions on bridges as on track. Hard pine ties were put in in 1890, on a bridge over the Kankakee River at Momence, without tie plates. The rail has worn into the ties from 1/2 in. to 3/4 in. deep. The most wear is on the northbound track, where the traffic is heaviest and the largest amount of switching is done. I should not recom-

mend tie plates for oak ties or where light rolling stock is used, or where the traffic is light. I think that under the last named conditions, ties would rot before being cut very deep by rails crawling; which does the cutting of ties and not the weight. Heavy and frequent trains increase the crawling of rails.

This report was accepted without discussion.

Hand vs. Air-Riveting.—Committee: Chairman, A. B. Manning, Missouri, Kansas & Texas; A. Shane, Toledo, St. Louis & Western; George J. Bishop, Chicago, Rock Island & Pacific; O. J. Travis, F. W. Tanner, Missouri, Kansas, and F. S. Edinger, Southern Pacific.

This report consists of letters from several members of the Committee from which the following extracts are taken. Mr. A. B. Manning says, in part:

Since 1890 this company has been steadily replacing all wooden and combination truss bridges with steel, and up to May, 1899, all riveting in field has been done by hand; since May, 1899, we have erected 22 new steel spans of various lengths, aggregating in all 2,455 lineal feet. Besides this we have repaired several old spans taken down, reinforcing, changing floors, raised to safe clearance, etc. In doing this we have used pneumatic tools for riveting, chipping, drilling and reaming. In the erection of the 22 new spans a record was kept of the number of rivets driven, viz., 80,065. In the repair work we did not pay as close attention to the number driven, but there was a large number.

With pneumatic riveting hammers I find two men and one heater can average daily (10 hours) 500 rivets, whereas by hand, 250 rivets per day was a good day's work (more often less) for three men and one heater. One day we drove 700 rivets, by using an additional man to take out fitting-up bolts, etc. This was the work of one air hammer only. In inspecting rivets, I find the work far superior to hand work. There are fewer loose rivets, heads are invariably perfect, the shank of the rivet fills the hole, and in every way are far superior to hand work done by our men, or by others in the past; also the work can be done readily in places where great difficulty has been experienced with hand tools. It seems useless to call attention to the benefit of reamed holes in assembling joints made by pneumatic drills over the "drift pin work," so much in use, where hand riveting prevails; but with the rapidity that air drills run, the expense of reaming rivet holes has been reduced to a minimum.

The pneumatic plant in use on this road for bridge work consists as follows: One 12-h.p. Fairbanks, Morse & Co. combined gasoline engine and air compressor; two galvanized iron water tanks; one galvanized iron gasoline tank; one boiler iron main reservoir, "large"; one boiler iron auxiliary reservoir, "small"; one No. 2 Boyer pneumatic hammer, old style; two New Boyer 000 1 6-16 x 5 in., pneumatic hand-riveting hammer; two hand steam drills (running them with air), with necessary hand, spring, and air dollies, rivet snaps, forges, drill bits, reamers, and other small tools necessary to this class of work. The compressor and tanks are all mounted in a box car.

The 12-h.p. gasoline engine and air compressor furnishes more than enough air to operate all of our tools at the same time. By using the small reservoir at the bridge and the main reservoir on the car, and operating at 90 lbs. pressure, we have had in use at one time three hammers, two drills, two heater forges, and one blacksmith forge, and have been able to get full capacity out of all of them. We have now ordered additional tools, as we find we have sufficient power to operate them, especially when cutting out the old steam drills. We bought two 000 New Boyer hammers, 15-16 x 5, and last month we ordered a No. 2 Boyer piston drill and a latest improved New Boyer long stroke hammer; this hammer and drill I have seen in actual service, and think they are as near perfect as it is possible to get. In using these hammers we find they are free from vibration or concussion that has been somewhat of a drawback to pneumatic hammers I have noticed in the past. We use hand riveters only in field work on bridges, as we have not driven over 3/4-in. diam. rivets, and think in such class of work they are more economical than a yoke riveter. In handling larger rivets, repairing or rebuilding work done in yards or shops, a yoke riveter could be worked to good advantage. In field work there were many difficulties when doing hand work that would cause delays that are now overcome quickly by use of air. In chipping, cutting out, reaming, drilling, etc., work can be done in a fraction of the time that it used to take, and when done you have a good, presentable piece of work; in fact, I consider pneumatic tools are so far ahead and superior to hand work in everything, that it is practically unnecessary to explain their uses.

It costs us the same to spur out at a bridge site, as we always spurred out when running a hand gang, and by increasing the pipe line we can invariably find a good location for the outfit cars with small expense. In putting in staging or falsework for riveters we find the cost is less, and by doing the work faster by air enables slow orders, or delays to trains, to be reduced. A detail estimate of the cost of work with three riveting hammers, including the first cost of the plant, repairs, depreciation and supplies results in the following statement: Men with a pneumatic riveter will average 500 rivets per day for \$8.12, or per hundred, \$1.62; men with hand power average 250 rivets per day for \$9.20, or per hundred \$3.68. The above figures demonstrate that it costs more than double to drive rivets by hand than by using pneumatic tools.

Another point when you have a compressor outfit when rebuilding old bridges, by putting in a sand blast you are able to eradicate all rust spots that you find in all cases on old iron, which it is practically impossible to do

by hand. This leaves iron in perfect condition to receive paint, and you then know that rust spots have not been hidden under a coat of paint. I think the amount invested in a good pneumatic plant is one of the best investments a railroad can make, especially now that steel structures are so much in evidence on all first-class roads.

Mr. F. S. Ettinger says, in part:

At present we have two complete pneumatic plants in the field, each consisting of a 12-h.p. gasoline-driven compressor and tools. The first plant which we purchased consisted of one compressor, two pneumatic yoke riveters, two pneumatic riveting hammers, and two air drills, one of which was fitted with angle gear for getting into corners not accessible to the drill proper. We found that the yoke riveters answered the purpose very well in riveting cover plates and other straight work where, when once suspended, they would reach a number of rivets, but they were great time consumers when it was necessary to move frequently. The riveting hammers which were quick acting and short stroke did not give good results, the blow being too light to upset the shank of the rivet to fill the hole, and the concussion of the hammer was very distressing to the operator. We have since secured hammers which have a long, heavy stroke with which we get satisfactory results as to the quality of the work and the effect on the operator is not injurious.

We have two plants in use at the present time. The one used by the steel bridge erecting gang consists of the following tools: One 12-h.p. gasoline-driven air compressor; five long-stroke pneumatic hammers; one pneumatic yoke riveter; one pneumatic clipping hammer, and two pneumatic drills, together with the usual complement of forges and holding-on appliances used in hand riveting.

The yoke riveters hold as well as drive the rivet. With the long-stroke hammers we use the usual suspended dolly-bars, spring-dollies, or lever-dollies, as may be best suited to the condition (the same appliances as would be used were the rivets to be driven by hand) and no more difficulty is experienced in holding the rivets up to the work than were they to be driven by hand. The hammers upset the rivets well into the hole and the heads are very much better than can be made by hand, in fact nearly all heads are absolutely perfect. Two men and a heater form a riveting gang, and they drive double the number of rivets per day that the gang of three men and a heater were driving by hand. Where there are a great many rivets of one length to drive, as in lattice girders, water tanks, etc., we use a portable furnace with an air blast, and one heater supplies two riveting gangs with hot rivets. The amount of staging required, from which to drive rivets with pneumatic tools, is very much less than is required for hand riveting, as it is only necessary to provide seats or standing room for two men, for which oftentimes a single plank suffices. In riveting viaduct towers, laterals in spans, etc., where there are only a few rivets to be driven in a place, the saving on erection of staging alone is a very considerable item.

We now have the air compressor set up in one end of a 50-ft. standard tool and material car which, in addition to carrying the compressor, receivers, circulating tanks, and pneumatic tools, serves to transport other tools and rigging from one bridge to another. We use a Wharton climb-over switch, which is dropped between the rails temporarily and the car is spurred out on the temporary track, as near to the work as is practicable. This saves the expense of handling and setting up the plant on the ground for each bridge, and is much cheaper. With plenty of storage room for compressed air, so that the pressure will not run down suddenly, we can operate five riveting hammers at once, with a 12-h.p. compressor or two drills and two hammers without reducing the pressure to less than 75 lbs. The drills use a great deal more air than the hammers, from the fact that they run uninterruptedly, while the hammers when driving 50 rivets of 3/4-in. diam. per minute are using air only about 5 per cent. of the time, which gives the compressor a chance to catch up. We have a storage capacity of about 80 cu. ft., and I think we could use one or two more riveting hammers by increasing the capacity of our compressed air receivers, as the compressor is frequently cut out by reason of the pressure being at maximum (90 lbs.) and the relief valve open.

With pneumatic tools a great many rivets can be readily driven in places which would be inaccessible to hand tools, from the fact that a rivet can be driven where there is room to insert the hammer, which is about 20 in. long.

The chipping hammer is frequently used in trimming and capping, and with it all anchor bolt holes in masonry, up to 1 in. in diam., are drilled by simply inserting an + pointed drill and holding it up to the work. Larger holes are drilled with heavier hammers. There is a saving of about 25 to 40 per cent. over the cost of hand work in drilling these holes. In fitting up the work ready for riveting, a reamer is used in the drills which one man readily handles, and with which all mis-matched holes are reamed, and which insures a full bearing for the rivet and does not burr and separate the plates as is the case where drift pins are used. This, while perhaps not reducing the cost very much, improves the character of the work. We also use the air drills for boring all bolt holes in bridge floor timbers by inserting an auger in place of the drill. This results in a saving over the cost of hand boring of about 50 per cent., which could be further increased, I think, by using the pneumatic boring machines, which run at higher speed and are more convenient to handle.

The cost of fitting up and riveting on new steel bridges (all rivets 3/4 in.) averages to date 35 per cent. less than if the work had been done by hand for all work done

since we have had the pneumatic tools in use. Work now being done with pneumatic plant costs 40 per cent. less than hand work, and we expect to still further increase this percentage as the men become more expert with the tools. The character of the work is much better than we have been able to do by hand.

In case the work is of too great magnitude for one plant, we install both compressors and combine all of the tools, but usually one plant is sufficient. When not engaged on bridge work we use our second plant in the erection of steel tanks and in timber work, such as cofferdams, grillages, slip sheathing, etc., where there is a great deal of boring to do. In the erection of steel tanks we use the yoke riveter. For the horizontal seams the yoke is hung on rollers which roll on the top edge of the sheet, and for the vertical seams the yoke is suspended by means of light differential pulleys which allow of adjustment of the yoke to the proper height. The chipping hammers are used for calking. The saving in pneumatic over hand work on a 60,000 gal. tank is about 25 per cent. My experience with pneumatic tools has demonstrated to my entire satisfaction that all work to which they are applicable can be done much cheaper and also much better than by hand.

There was very little discussion of this report as, outside the Committee, few had had much experience with pneumatic tools. It seemed, however, to be the general opinion that the pneumatic hand hammers have now reached such a stage of perfection that on work requiring a large number of field rivets they can be used economically and that the work done in this way is far superior to hand riveting. For small jobs of erection the chief drawback is the cost of setting up a compressor plant.

During the meeting Mr. Walter G. Berg, Chief Engineer of the Lehigh Valley Railroad, read a paper entitled, "Education of Men for Subordinate Positions on Railroads," and Mr. Onward Bates, Superintendent of Bridges of the Chicago, Milwaukee & St. Paul, presented a paper, "The Superintendent of Bridges and Buildings: His Duties and Responsibilities."

The officers elected for the ensuing year are as follows: President, W. A. Rogers, Chicago, Milwaukee & St. Paul; First Vice-President, W. S. Danes, Wabash; Second Vice-President, B. F. Pickering, Boston & Maine; Third Vice-President, A. Shane, Toledo, St. Louis & Western; Fourth Vice-President, A. Zimmerman, Colorado & Southern; Secretary, S. F. Patterson, Boston & Maine, and Treasurer, N. W. Thompson, Pittsburgh, Ft. Wayne & Chicago. The Executive Committee consists of W. E. Smith, Chicago, Milwaukee & St. Paul; F. W. Tanner, Missouri Kansas Railway; H. D. Cleveland, Pittsburgh, Bessemer & Lake Erie; A. Montzheimer, Chicago, Milwaukee & St. Paul; T. M. Strain, Wabash Railroad, and A. W. Merriek, Chicago & Northwestern.

The next annual meeting will be held at Atlanta, Ga., and the following subjects will be reported on by committees:

Methods of sinking foundations for bridge piers in water 20 ft. deep and over.

Passenger platforms at way stations.

Slips for ferryboats used for transferring cars.

Best method of operating turntables by power.

Auxiliary coaling stations, including design, capacity and method of handling coal.

Water stations, including materials for foundations, tanks, substructure, connections and capacity.

Is it best for railroads to erect their own steel structures or let the erection to manufacturers?

Outfit cars for bridge gangs and the number of men constituting a bridge gang.

American Society of Railroad Superintendents.

The annual meeting of this Society was held at the Holland House, New York City, on Oct. 18, in accordance with the announcement which had been sent out by the Secretary; but the attendance was very small and the meeting resolved itself into a committee of ways and means to discuss the question whether or not the Society has sufficient vitality to warrant its continuance on the present plan. For several years the attendance at the meetings has been small and there have been but few papers that dealt with subjects which were of such a practical and interesting nature as to bring out useful discussions. According to some of the men who spoke, there have been only two good meetings in the last 10 years. At one meeting in New York City, several years ago, special effort was made to enlist the interest of general superintendents; and a number of roads at that time took formal action, practically directing their division superintendents to make it a duty to attend the meetings of this Society. For a time this action seemed to have produced good results. Two or three roads sent a number of superintendents in a body, in special cars, and on other roads the officers who are members of the Society have continued to be regular in their attendance. But this apparent improvement did not continue long.

A number of members spoke of the desirability of narrowing the field of the Society. Although superintendents take an interest in civil and mechanical engineering subjects they should not bring topics of those classes into this Society; for a superintendents' society should deal with matters of transportation, station service, discipline and dealings with the public. Again, it seems evident, from the experience of other organizations, that howsoever useful the business sessions of a society may be, the social element is essential if a large attendance is to be secured. One member stated that a number of New

England members of this Society had practically given it up and turned their attention to the New England Association of Superintendents; but in reply to a question he stated that the latter was mostly social and informal.

Finally, after a full expression of opinion from the members present, the Executive Committee was instructed to call the meeting of next year to be held at Buffalo in October, that being the last month of the Pan-American Exposition, which is to be held in that city; and the Committee was instructed to investigate the condition of the Society and be ready to report what ought to be done; if deemed best the Committee should recommend changes in the number and in the duties of the standing committees. In connection with this last feature Mr. Sully said that a report ought to be prepared by a competent committee dealing in a thorough and analytical manner with the questions of management which come within the province of division superintendents, with a view to eliciting a discussion which should bring out the experi-

and, as before stated, the next meeting is to be held at Buffalo in October, 1901.

On Friday the members in attendance at the convention visited some of the freight terminals in New York Harbor, being the guests of the Erie Railroad. The party was taken in a tug up and down the North and East Rivers, enabling the visitors to get an idea of the lighterage limits of New York Harbor and the extent and variety of the work involved in the delivery of freight by the railroads. The guide of the party was Mr. M. E. Staples, General Agent of the Erie road.

Development of New York Central Locomotive, Class I-3.

During the past month New York Central locomotive No. 947 has been hauling the Empire State Express between Syracuse and Buffalo. This locomotive is a de-

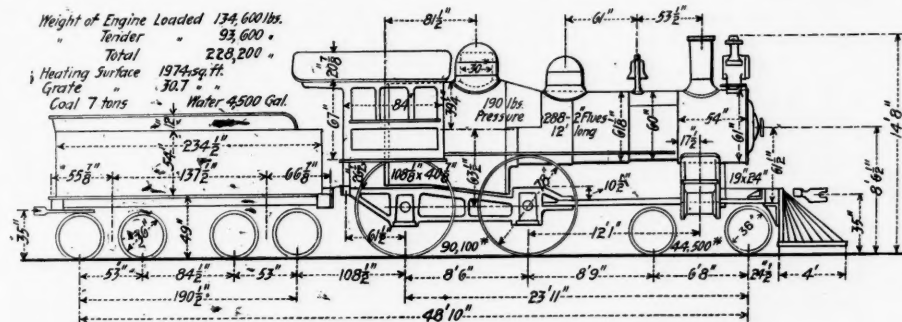


Fig. 1.—New York Central Locomotive, Class I-1.

ence of members. In particular, Mr. Sully desired a discussion of station service and the economical management thereof, and all matters included under the head of dealings with the public, such for example as claims for damages, complaints of insufficient or improper service, etc.

The formal proceedings of the meeting were brief. President W. L. Derr, in his opening address, referred to the desirability of confining the work of the Society to those features of the duties of Superintendents which are not covered by the work of other societies. These exclusive features are by no means unimportant. Signaling is properly a Superintendent's subject. The one topic, discipline, includes many things which ought to be discussed. The employment of men is always a live topic; we employ too many men. As it is cheaper to buy locomotives than to have large forces of men in your own shops, so it would probably be economical to have track work done by contract. Even trainmen might be paid by the ton-mile, and, in the belief of the speaker, economy would result. Men would get heavy trains over the road in better time and would not be constantly scheming to get the easiest trains. The policing of a railroad is an important subject for Superintendents to discuss. A good judge of the matter has said that the railroads are responsible for the tramp nuisance. Superintendents should come to meetings not as civil engineers or mechanical engineers but as managers of a big establishment engaged in the manufacture of transportation.

Secretary C. A. Hammond was kept away from the meeting by reason of illness. In his report he gave the membership as 195, the lowest for some years. He recommended that in order to revive interest in the Society the dues of members in arrears should be cancelled; but

velopment of Class I-1 brought through the working out of engines known as Class I-2, and it should not be confounded with engine No. 947, having a corrugated cylindrical fire-box, a description of which was published in the *Railroad Gazette* of September 1, 1899. Loco-

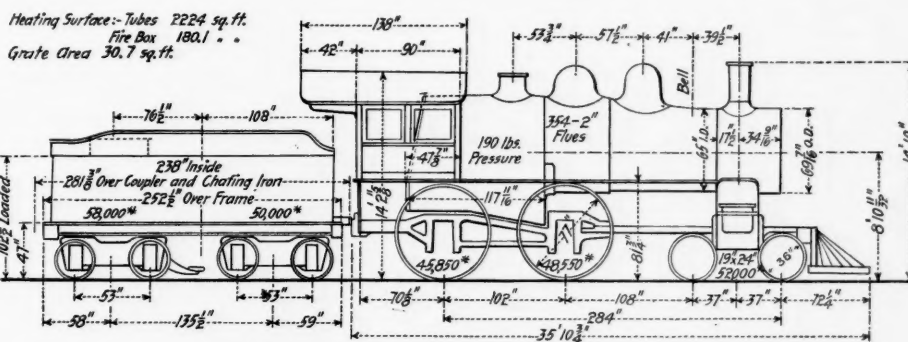


Fig. 3.—New York Central Locomotive, Class I-3.

motives of this railroad have been renumbered since that date. The Class I-3 is so denominated for convenient record rather than for the designation of a distinct class, as it is the only locomotive of its kind now in use on the New York Central Railroad. It was built as a step in the design of a class of locomotive which will probably later take a prominent place in the motive power of the road rather than as a locomotive which should be the final type of engine hauling one of the fastest long

work, including the work of erecting, was done at the New York Central & Hudson River Railroad Company's Depew shops.

Some Notes on Rail Joint Fastenings.

BY F. C. SCHMITZ, ASSOC. M. AM. SOC. C. E.

(Concluded from page 686.)

THE FUTURE OF THE RAIL JOINT QUESTION.

In the light of past experiences, it is not, perhaps, wise to be too specific in the prophecies made concerning the future of the rail joint. The question has been settled many times to the temporary satisfaction of its students and has been again opened by those same students and again arranged on a different basis. It is, therefore, very difficult to say whether we have, in our present improved joints, finally arrived at a type of fastening that is capable of indefinite expansion with efficiency always, or have simply evolved a device that is sufficient for our present needs, but will not suffice for the possibilities of the future.

A gathering up of the threads from what has gone before shows thirteen primary or fundamental requirements imposed on every joint device.

1. It must allow of expansion and contraction of rail due to changes of temperature.
2. It must compel the rail ends to act as the body of the rail.
3. It must be capable of taking up the irregularity of rail sections.
4. It must have vertical rigidity enough to insure a total deflection of rail ends and joint, equal to that in the body of the rail, and no more, for a given load.
5. It must have sufficient bearing area against the rail to prevent any cutting of one part into another.
6. It should not produce a variation in the running width of rail head.
7. It should be simple, preferably of but two pieces.
8. It should be mechanical in construction.
9. Its efficiency should not depend on the adjustment of one of its parts against another.
10. It should not require a special form of rail end.
11. It should not require a special arrangement of other track material, as spacing of ties, etc.

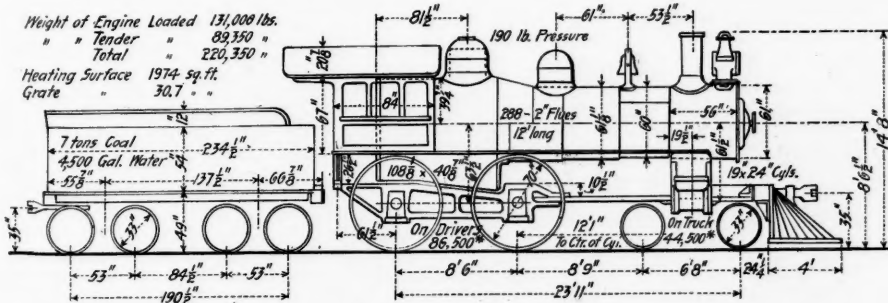


Fig. 2.—New York Central Locomotive, Class I-2.

the meeting did not approve this recommendation. The Treasurer reported cash on hand at the beginning of the year \$838, receipts \$813, total \$1,651. Payments \$991, on hand at end of year \$660. The only committee report was that of the Committee on Transportation, and this was wholly informal. Mr. A. W. Johnston (N. Y. C. & St. L.), who made it, recommended that the Society confine itself to questions of discipline, rules, station service and perhaps signaling. Mr. Johnston brought out in a forcible way the fact that the Society is at the parting of the ways, where it should either be made stronger or else abandoned; and his setting forth of the case brought on the discussion which we have already reported. The membership of the Society is widely scattered and will not come together except for a meeting which promises to be profitable and entertaining; and such a meeting cannot be had unless committees will get up papers which will elicit useful discussions.

The present officers were re-elected by acclamation,

distance trains in the world. It was intended to so modify Class I-2 as to give a large boiler and reserve of steam with as little change of engine design as possible to serve the purpose.

From the diagrams which appear herewith it may be noted that cylinder proportions remain the same throughout the development from Class I-1 to Class I-3. The apportionment of wheel base is practically identical in all, there being a slight alteration of the spread of engine truck wheel centers, the distances from center to center of driving wheels and from center of engine saddle to center of first pair of driving wheels remaining as in the original design.

The working steam pressure is 190 lbs. per sq. in. for the three classes. In Fig. 1, Class I-1, the total heating surface is 1,974 sq. ft., there are 288 two-inch flues 12 ft. long and a grate area of 30.7 sq. ft. The diameter of the first ring of the boiler is in this engine 60 in. These proportions hold throughout in Fig. 2, Class I-2. In

12. It should not be expected to overcome the creeping tendency.

13. It should be capable of application and renewal without disturbing the rails, ties, or ballast.

The question of cost has been avoided in the above requirements, purposely. The perfect joint, or one that entirely eliminates the effect of rail joints from the track problem, is not possible. Could it be designed, however, it would be economical at \$20 each. There is little question that under the conditions just named, the life of rail would be nearly double, while maintenance expense would be less than half. Sixty per cent. of the present maintenance labor is expended on the 4 ft. of each rail containing the joint. At \$50 a month per mile this foots up \$360 a mile annually. The following calculation shows what could be reasonably expended for the perfect joint, on the above basis:

Cost of one mile, single track, 100 lb. rails, at \$20....	\$3,140
Cost of one mile, single track, angle bars, at \$1.20....	420
Renewal fund, track and angles, which at 4 per cent. would yield \$3,560 in nine years' interest, compounded annually.....	8,400
Labor fund, which yields, at 4 per cent., \$600 annually.....	15,000

Total first cost per mile on a nine-year basis.....\$27,960

Cost of one mile, single track, 100-pound rail as above	3,140
Renewal fund for rail, 18-year basis, as above.....	3,080
Labor fund for 45 per cent. present maintenance.....	6,740

Total first cost, 18-year basis, less joint cost.....\$12,960

Total, nine-year basis.....	27,960
Total, 18-year basis (no joints).....	12,960

Available fund for joints and renewal if life of rail and joints is 18 years.....	\$15,000
First cost of joints.....	7,600
Fund for renewal after 18 years.....	7,400
For 350 joints, at \$22 each (approx.).....	7,600

A joint, therefore, that would practically double the present life of rail, and eliminate the joint from track, would be cheap at \$20 each.

The angle bar joint, for reasons known to every railroad man, possesses features that preclude its abandonment. Whatever the future may produce in the form of a rail fastening, it is almost certain that it will be built up from some type of angle bar splice. True it is, that the angle bar restricts expansion and contraction. So does every other type of splice at present on the market; so did every joint ever invented. The only solution in regard to expansion, is to tighten the joint as much as possible without restricting the expansion tendency.

The angle cannot fulfill condition No. 5. There is not space enough under the head of any of the existing types of rail to give the proper bearing area. Consequently, an additional point of support must be sought. This is available only under the base of rail. It is along the lines, therefore, of a splice, supporting the head and base of rail, made up of as few parts as possible, preferably two, and having the depth that insures correct vertical rigidity, that the joint of the future will be developed.

That the "Continuous" rail joint fills more of the above requirements than any other, is due partly to its shape and partly to the manner in which it is made. The other joints of the same general type would be as good were they rolled, and not cast as at present.

The fastening between splice and rail will in all probability continue to be the bolt. With a base plate joint in two pieces, the tendency to become loose is greatly diminished as is the stress. Consequently, the great objections to the use of bolts have been overcome. The bolt with the assistance of the improved bar is the most efficient fastening now in use.

There will be no spike slot in the joint of the future and track will be held from creeping by efficient concrete or stone anchors.

From the foregoing it is clear that, in the mind of the writer at least, no radical change in the present form of track is to be looked for. Naturally track work will be more and more improved as invention and ingenuity devise ways of bettering conditions. Ballast will be placed with more care and pains; ties will be more carefully selected and spaced; labor will become more experienced and skilled; in fact, total efficiency will be greatly enhanced. Undoubtedly rails and splices will become heavier and deeper, and the whole scheme of track stresses and resistances will, in the next few years, be much greater than is now considered maximum. The present improved splice are capable of indefinite expansion, with efficiency at any weight of rail, consequently it is not mere prophecy to say that the limit, as far as design is concerned, has been reached.

Cast-Iron Car Wheels.

Last week we published a paper on this subject, presented before the Western Railway Club, by Mr. G. W. Beebe, of the Chicago, Burlington & Quincy. What follows is taken from the discussion of that paper:

Mr. G. R. Henderson, Assistant Superintendent of Motive Power, Chicago & Northwestern: In the paper there are given the results of some chemical analyses of wheels which have failed to stand the thermal test, others that did stand it, and the same with reference to the drop test. I wish to call attention to the fact that these are not altogether a great source of comfort. You will find that of the wheels which stood the test in both cases, the majority of the ingredients are included in the limits of those that did not stand it. In other words, it is pretty

difficult to form or advance a chemical proportion of metals in the wheel which will give us just what we want. Take for instance the total amount of carbon in the wheels that failed to stand the drop test and those that did stand it. The limits of those that failed to stand it are from 3.42 to 3.87, and those that did stand it between 3.49 and 3.93. You see in that case there is quite an increase, that is, they show the total amount of graphite has been quite high in the successful wheels. Now take the wheels that failed to stand the thermal test. We will see that the variation of those that did not stand the test is from 3.63 to 3.91, and those that did stand the test from 3.38 to 3.90. I mean to say that these so overlap each other that you might find a wheel that stood the test perfectly, and another wheel that did not stand the test at all, and you practically have the same analysis.

Some years ago we went into this matter pretty thoroughly, having been asked to prepare specifications for wheel irons, and, after examining and analyzing possibly in the neighborhood of 100 wheels of which we had the records, either from having stood or having failed to stand a certain series of tests or amounts of service, we came to the conclusion that a desirable analysis was about as follows: Total carbon, 3.25 to 3.75; graphitic carbon, 2.75 to 3; combined carbon, .50 to .75; sulphur, .05 to .08; manganese, .30 to .50; silicon, .50 to .75; and phosphorus, .35 to .45.

Now we also found that some wheels that we analyzed having a life of from 8 to 11 years, gave the following analysis: Graphite, 2.56 to 3.10; combined carbon, .63 to 1.01; silicon, .58 to .68; manganese, .15 to .27; sulphur, .05 to .08, and phosphorus, .25 to .45. These wheels we knew had given excellent wear, as they had been running eight to 11 years, and the proportions which were designated as a desirable analysis coincide very closely with these wheels that gave good service.

I think that the introduction of thermal tests has produced this effect; the percentage of manganese has been largely increased. Before the thermal test was adopted the manufacturers did not pay so much attention to the amount of manganese, but it was found after going into the thermal test treatment that an addition of manganese, or ferro-manganese would very largely increase the chance of standing the test. Taking the usual and ordinary iron wheel and supposed to be a good mixture, the wheel would crack in a half second. But by the addition of a small percentage of manganese, about $\frac{1}{4}$ of 1 per cent., the wheel would stand for 15 to 20 minutes or until the ring poured around it was entirely cold, and there was no sign of fracture. When we introduced the ferro-manganese it

terminated, because we have only had a year's experience with this method, therefore we cannot yet determine what the effect upon the wear of the wheel will be, but it certainly did make a wheel that was stronger, that would not crack under severe applications of the brakes.

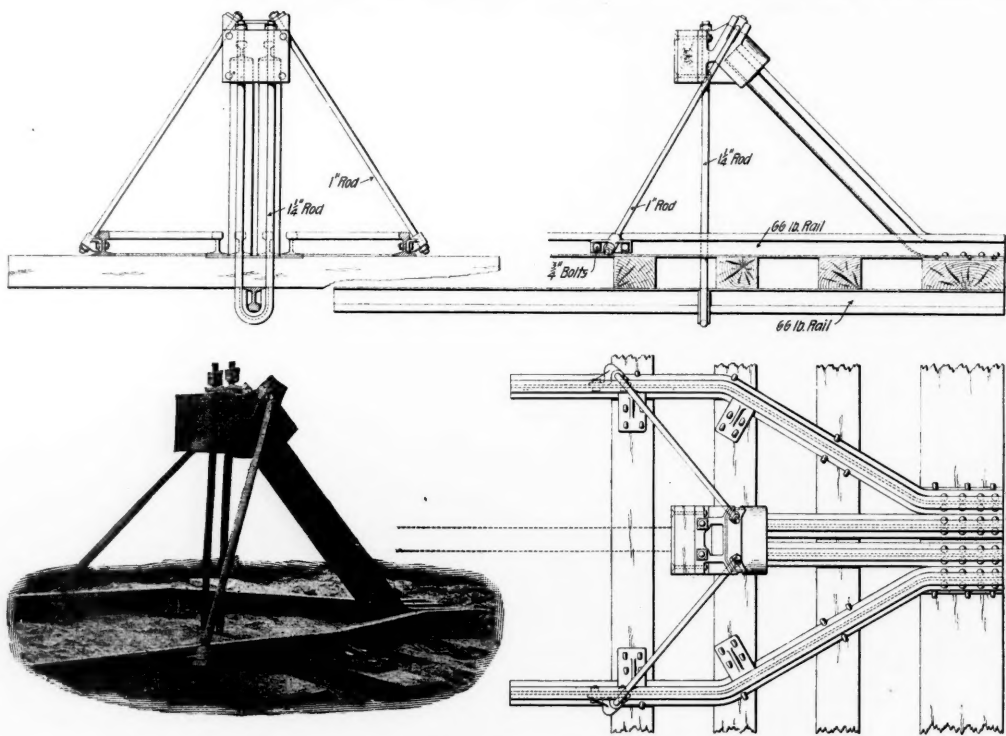
Mr. F. A. Delano, Superintendent of Motive Power, Chicago, Burlington & Quincy: The American engineer ought to pay a tribute to wheelmakers and to the railroads in that we have been able to make a success of the cast-iron wheel in this country. That is a matter of great wonder to foreign engineers, that we dare to use a brittle metal in wheels in fast passenger and freight service, carrying the enormous loads that we do. As Mr. Beebe and others have pointed out, the wheelmakers have kept pace with the requirements, and I believe it is safe to say that the cast-iron wheels of to-day which cost something like a cent a pound, or even less than a cent a pound, are fully equal in quality, if not better than the steel-tired wheels of ten years ago, which cost a great many times that amount.

Just as Mr. Henderson has pointed out, the analyses presented by Mr. Beebe tend more than anything else to show how little analysis will tell us. The variations as pointed out by Mr. Henderson of the failed wheels are within the limits of the wheels that stood the test. But that is no reason for not continuing that kind of work, or that kind of investigation. The physical tests and the thermal tests have done a great deal to develop a wheel that will stand hard service. The wheelmakers say that the thermal test is unnecessarily severe, and I must confess that a very careful test would certainly indicate that the thermal test was a good many more times as severe as any possible test that the car wheel would receive in service with brake shoes applied. But the thermal test has done so much to bring up the quality of the wheel in respect to toughness that I believe it is a good thing.

A New Bumping Post.

The Drexel Railway Supply Co., Chicago, had a new bumping post on exhibition at the St. Louis meeting of the Association of Railway Superintendents of Bridges and Buildings, which is receiving much favorable attention from railroads. This is simple in construction and requires practically no foundation work, and the bumpers can be put in by section men alone. Being on the surface, it is easily moved from one place to another. The construction is clearly shown by the engraving.

The bumping head is a heavy iron casting faced with a wooden block and plate. This head is firmly attached to



The "Gibraltar" Bumping Post.

seemed to increase the strength for the drop test also. The wheel would run up to 60, 70 or 80 plus, with the addition of a small amount of ferro-manganese. We had a small box which contained the proper quantity, about $\frac{1}{4}$ of 1 per cent., and this ferro-manganese was ground up in a big cast-iron mortar, and just as the wheel was about to be poured this measure was thrown into the molten mass, stirred a little and then the wheel was poured and that seemed to be almost magical in its effect. It made the wheel stand the thermal test every time, and also the drop test. Irons that are deficient in manganese seem to be revived by this method.

We have taken the iron from the furnace at one time, which gave us a large amount of manganese, but in a shipment at another time the manganese was less than 1 per cent., and the wheels were correspondingly brittle, but by using this ferro-manganese we were able to recuperate the mixture and get a wheel that would stand the thermal and drop tests. Whether that would affect the wear of the wheel or not is a question yet to be de-

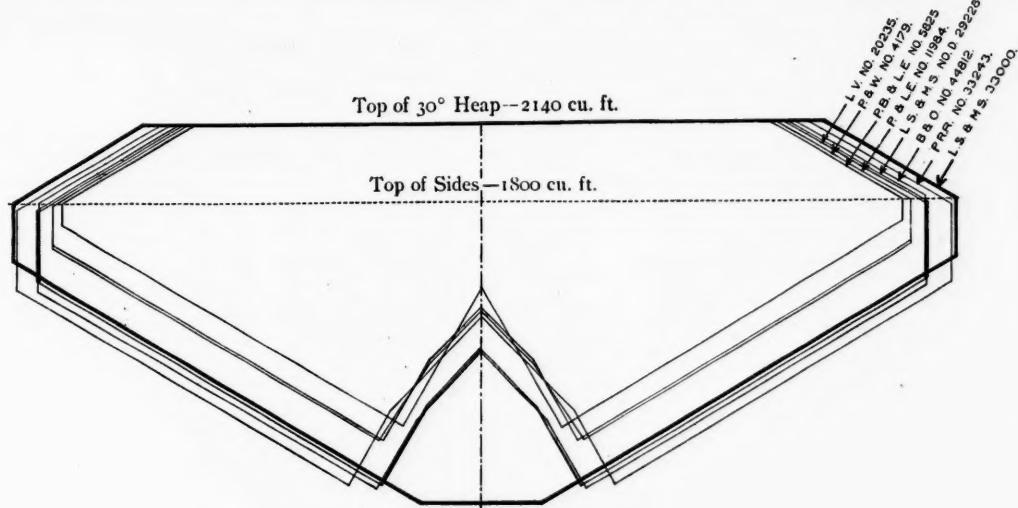
two brace rails, which extend down and back and at the lower end are riveted to a wide plate; the track rails are bent inward and riveted to the same plate, which in turn is spiked to a broad tie. As will be seen, the impact of a car tends to rotate the brace rails backward and raise the bumping head, and this movement is resisted by the brace rails and by long $1\frac{1}{4}$ -in. "U" rods, which pass through the head and underneath an inverted rail placed beneath the ties at the center of the track. This inverted rail extends forward from the end of the bumper to a point back of the first truck wheels. The 1-in. diagonal rods from the bumping head to the malleable iron brackets on the track rails are not counted on to resist impact, but are merely guys to keep the head central. All parts of the bumper above the ties are furnished as well as the lower rail casting which forms a seat for the vertical rods. It will be seen that the rails of the track join the bumper rails just ahead of the diagonal stays, and this joint is made with six-hole angle bars. The post is called the "Gibraltar."

Structural Steel Hopper Cars.

We noticed a few weeks ago in the department of Trade Catalogues a very interesting pamphlet recently issued by the American Car & Foundry Company. It is designed to present to the reader the possibilities of standard sections of steel for building 50-ton hopper cars with a low ratio of dead weight to paying freight, also to suggest to railroad officers the economies to follow from the use of such cars not only because of their light dead weight but because of reduced delay and low first cost of repair parts.

The pamphlet reviews the development of the modern

steel car and sums up comparative data of capacity, weight, etc., in two tables, which we reproduce. These tables explain themselves. In making up their tonnage capacity the weight of anthracite coal per cu. ft., loaded in cars, is taken at 52.08 lbs. and the weight of bituminous coal at 52 lbs. The cubic contents of the various cars as given in the tables are calculated from detail drawings or from measurements of cars in service, and it is believed that the limit of error in the calculated results is not more than 2 per cent. The diagram shows central longitudinal sections of several self-clearing steel hopper cars now in use. The diagram in heavy line, namely, the Lake Shore & Michigan Southern car No. 33,000, is from



Load Diagrams of Several Steel Hopper Cars—55 Net Tons of Coal.

TABLE I.—COMPARATIVE DATA CONCERNING WEIGHTS AND CAPACITIES OF DIFFERENT TYPES OF HOPPER BOTTOM CARS.

Type.	Builder	Owner or Lessee.	Car number.	When built.	Contents, cu. ft., top of 30° heap.	Actual maximum coal capacity at 52 lbs. per cu. ft., top of 30° heap.	Marked capacity, lbs.	Marked light weight, lbs.	Maximum ratio dead weight to paying freight for coal, at 52 lbs. per cu. ft., per cent.	Standard maximum ore capacity, lbs., governed by size of axles.	Maximum ratio dead weight to paying freight for ore, per cent.	Average ratio dead weight to paying freight for coal and ore, per cent.	Axles.
Wood (Canda's).	American Car & Foundry Co.	Central Pacific R. R.	90,564	9-11-1899	1980	102,960	100,000	33,730*	32.8	110,000	30.7	31.8	5 1/4 in. x 10 in.
Pressed steel.	Pressed Steel Car Co.	Lake Shore & Mich. South. Ry.	29,223	1899	2072	107,740	100,000	36,600	34.0	110,000	33.3	33.7	"
Pressed steel.	Pressed Steel Car Co.	Lehigh Valley R. R.	20,235	11-1899	2072	107,740	100,000	37,600	34.8	110,000	34.3	34.5	"
Structural steel.	American Car & Foundry Co.	Lake Shore & M. S. Ry.	33,000	3-1900	2140	Possible heap 111,280 Service load 110,000	110,000	38,300	34.4	110,000	34.8	34.6	"
Pressed steel.	Pressed Steel Car Co.	Cleveland & Pittsburgh Ry.	4,596	1-1899	2127	Possible heap 110,600 Service load 110,000	100,000	39,325	35.6	110,000	35.8	35.7	"
Pressed steel.	Pressed Steel Car Co.	Baltimore & Ohio R. R.	44,916	4-4-1899	1875	Possible heap 97,500 Service load 88,000	95,000	34,800	35.7	88,000	39.5	37.6	5 in. x 9 in.
Composite.	Gillette-Hertzog Mfg. Co.	Northern Pacific R. R.	1898	1842	95,780	100,000	37,900	39.6	100,000	37.9	38.8	5 1/4 in. x 9 in.
Composite.	Norfolk & Western R. R.	Norfolk & Western R. R.	1890	1875	Possible heap 97,500 Service load 95,000	100,000	38,000	39.0	95,000	40.0	39.5	5 1/4 in. x 9 in.
Pressed steel.	Pressed Steel Car Co.	Pittsburgh & Western R. R.	4,179	8-1898	1523	79,200	100,000	34,400	43.4	88,000	39.0	41.2	5 in. x 9 in.
Structural steel.	Pressed Steel Car Co.	Pittsburgh, Bessemer & L. E. R. R.	5,825	10-1897	1319	68,590	100,000	37,150	54.2	100,000	37.2	45.7	5 x 9 nickel steel.
Structural steel.	Keystone Bridge Works.	Carnegie Steel Co.	1,009	1896	1300	67,600	100,000	39,950	59.1	100,000	40.0	49.6	4 3/4 x 9 nickel steel
Pressed steel.	Pressed Steel Car Co.	Pittsburgh & Lake Erie R. R.	11,984	3-1898	1578	82,060	80,000	32,000	39.0	88,000	36.4	37.7	5 in. x 9 in.
Structural steel.	American Car & Foundry Co.	Design only.			1764	Possible heap 91,730 Service load 88,000	88,000	34,600	37.7	88,000	39.3	38.5	5 in. x 9 in.

*These cars were built with axles having 5 x 9 journals; 1030 pounds has been added to actual weight for 5 1/4 x 10 axles and related parts.

TABLE II.—COMPARATIVE DATA CONCERNING WEIGHTS AND CAPACITIES OF STRUCTURAL STEEL HOPPER CARS.

Design.	Date.	Contents, cu. ft., level full.	Contents, cu. ft., top of 30° heap.	Marked light weight, lbs.	Dead weight, lbs., per cu. ft., carrying capacity to top of sides.	Dead weight, lbs., per cu. ft., carrying capacity to top of 30° heap.	Marked capacity, lbs.	Actual maximum coal capacity, at 52 lbs. per cu. ft., top of 30° heap.	Maximum ratio dead weight to paying freight for coal at 52 lbs. per cu. ft., per cent.	Actual maximum ore capacity, lbs.	Maximum ratio dead weight to paying freight for ore, per cent.	Average ratio dead weight to paying freight for coal and ore, per cent.	Axles.
Carnegie Steel Company, Ltd.	1896	1015	1300	39,950	39.4	30.7	100,000	67,600	59.1	100,000	40.0	49.6	4 3/4 x 9" Nickel Steel
Pittsburgh, Bessemer & L. E. R. R.	1897	1023	1319	37,150	36.1	28.2	100,000	68,590	54.2	100,000	37.2	45.7	5 x 9" Nickel Steel
American Car & Foundry Co.	1900	1800	2140	38,300	21.3	17.9	110,000	Possible heap 111,280 Service load 110,000	34.4 34.8	110,000	34.8	34.6 34.8	5 1/4 x 10" M. C. B. Specification

the American Car & Foundry Company's Class S H 50 car and the line indicating top of sides refers to that diagram. The tables show little choice between the latest examples of the American Car & Foundry Company and the Pressed Steel Car Company large capacity cars so far as concerns ratio of dead weight to paying load. The pamphlet contains the following computation of the saving to be made in transportation alone by the use of 55-ton steel cars as compared with 44-ton wooden cars:

S. H. 50 Steel Hopper Car—55 Tons Load Limit.

Dead weight per car (pounds).....	38,300
Paying freight (pounds).....	110,000
Total pounds	148,300
Total tons	74.15
Assumed average miles per car, per day.....	30
Total ton-miles per car, per day (74.15 x 30).....	2224.5
Revenue ton-miles per car, per day (55 x 30).....	1650
Average revenue per ton-mile.....	\$0.00724
Average revenue per car, per day (1650 x \$0.00724).....	\$11.95
Average operating expense per ton-mile.....	\$0.00471
Average operating expense per car, per day (2224.5 x 0.00471)	\$10.48
Net revenue per car, per day.....	\$1.47

Wood Hopper Car—44 Tons Load Limit.

Dead weight per car (pounds).....	38,300
Paying freight (pounds).....	88,000
Total pounds	126,300
Total tons	63.15
Assumed average miles per car, per day.....	30
Gross ton-miles per day (63.15 x 30).....	1894.5
Revenue ton-miles per car, per day (44 x 30).....	1320
Average revenue per ton-mile.....	\$0.00724
Average revenue per car, per day (1320 x 0.00724).....	\$9.56
Average operating expense per ton-mile.....	\$0.00471
Average expense per car, per day (1894.5 x 0.00471).....	\$8.92
Net revenue per car, per day.....	\$0.64
Difference per car per day in favor of Class S. H. 50 Steel Hopper	\$0.83

Assuming these cars to earn revenue only 150 days out of a possible 365, the direct saving thus effected per thousand cars, per year, approximates.....\$124,500
In this calculation no account has been taken of the additional economies due to the possible use of a smaller number of cars to handle a given tonnage, decreased cost of inspection and repairs, and minimum losses due to frictional resistances at the journals and the rail contacts, to say nothing of diminished switching charges and equivalent increase of yard room.

The New President of the "Tech." on Education.

The formal inauguration of Dr. Henry S. Pritchett, former Chief of the United States Coast and Geodetic Survey, as President of the Massachusetts Institute of Technology took place Oct. 24. A distinguished company was present, consisting of representatives of colleges and universities from all parts of the country and of the alumni, the entire main body of the hall being filled by the students, 1,250 or more in number. Brief addresses were made by Senator Henry Cabot Lodge, by Col. Thos. L. Livermore, on behalf of the Corporation, and by former President Crafts. The principal feature, however, was the inaugural address of the incoming president.

Dr. Pritchett's practical experience as director of perhaps the most important purely scientific branch of the Government service rendered his inaugural address upon "The Relation of Educated Men to the State" peculiarly suggestive. His insistence upon the obligations of the institutions of higher learning to maintain about themselves an atmosphere favorable to the growth of civic virtue is especially appropriate, coming upon the eve of a national election.

Dr. Pritchett explained that for some years as an executive officer of the general government he had been obliged to study the graduates of colleges and of technical schools from the standpoint of their efficiency in comparison with other men rather than from the standpoint of the teacher; from the standpoint of their ability to do things rather than from the standpoint of knowing how to do things. In this capacity he had been forced to consider the relation of educated men to the government, to compare their service to it with the service rendered by others. He called attention to the fact that a constantly growing proportion of the important places of the government are passing into the hands of college men and he asked the question whether the training received in our institutions of higher learning merely gave men increased power or did the college life also fit men for patriotic and loyal and unselfish service to the state.

While maintaining that on the whole the institutions for higher education had justified the aid which they had received from the state, President Pritchett brought forward certain qualities of education upon which he conceived the state had a right to insist and which had not always been remembered. He said "The state has a right to expect of those educated in a large measure by its aid a decent respect for the service of the state." He deprecated the widespread tendency to belittle government service, and to ascribe lightly the worst motives to public men. "The Government of the United States," he said, "is honestly conducted, and notwithstanding the crudeness of some legislation and the half-hearted service of a few, those who know best the machinery of the general government have a rational optimism concerning the success of democratic institutions and a wholesome respect for those who work in public service. Educated men will find in increasing numbers their best career in the states' service and college men should be the last to misunderstand and belittle it."

Another quality of the education given to the youth upon which the state has a right to insist is its catholicity. "No system of education," said he, "is a good one in which students and graduates get out of touch with the great body of their fellow citizens. The higher institutions of learning, if they are to fill their real place, must be not only for the people but of the people."

Beyond all such considerations, however, and including them all is the quality of citizenship which our education is likely to produce and what education ought to mean. President Pritchett referred to the literature of the subject, quoting Aristotle's summary, "What is education and how are we to teach and are we to aim at the development of the intellect or the moral character?" He called attention to the fact that the whole aim of modern education was the attainment of power, and to this end the intellect alone was considered in the training given to young men. He said that the state was interested in having in its service keen, efficient, intellectual men, but that it was still more interested in finding men of courage and patriotism and unselfishness. In other words, in the service of the state, if not indeed in all service, character counted for more than intellect, and unless the training of the colleges and of the universities produced men who were not only intellectually able but who were also strong in civic virtue, they fell short of their full duty. "The men who graduate from our higher institutions should, along with the training of their minds, grow into some sort of appreciation of their duties to the state, and they should come to know that courage and patriotism and devotion rank higher in this world's service than scholarly finish and brilliant intellectual power."

President Pritchett then took up in the light of these remarks the character of the training which comes from the study of applied science and called attention to the wise foresight of President Rogers and his associates in estimating the value of a scientific training, not only as a fitting for practical life but also in its development of character.

It happens that President Hadley took the opportunity, speaking at Vanderbilt University, to say something on the same subject. A few words from his address on "The Direction of University Development" follow:

Mere intelligence on the part of the voters, however great, is not sufficient to secure wise administration of the affairs of the country as a whole. Each change in industrial and political methods makes it clearer that they must have also a sense of trusteeship; and the

training of the sense of trusteeship is at once a more difficult and a more important thing than the development of mere political intelligence. . . . The industrial improvements of the century have for the most part tended toward increasing concentration of capital and monopolization of business. The self-interest of a monopolist, however enlightened, is not always sure to protect the public. To meet these difficulties a higher conception of public morality is requisite. These organizations of capital, and the organizations of labor also, are trusts in a sense which was not dreamed of when that word was first applied to them. Their dangers can be effectively met only when their character as trusts is recognized; only when there is a sense of honor in conducting them and a true public sentiment in dealing with them. Such public sentiment does not exist to any adequate degree. . . . There has been a similar development in matters political. The doctrine that each citizen and each district should get all that it can out of the general treasury and trust to the skill and shrewdness of other citizens or other representatives to prevent one person from taking undue advantage over another inevitably results in a sacrifice of the interests of the whole to that of the parts. If this has been the case in the Government of our own country, what shall we expect after the annexation of territory which, whatever its final destiny, must, for a long time, be unrepresented in the governing body of the federal union? The only protection for these newly organized territories lies in the development of the sense of political trusteeship.

Train Accidents in the United States in September.

COLLISIONS.

Rear.

2nd, 6:56 a. m., on Philadelphia & Reading, at Hatfield, Pa., a southbound passenger train standing at the station, taking on cans of milk, was run into at the rear by a following excursion passenger train and the engine and five or more passenger cars were wrecked. Nine passengers of the excursion and four in the milk train were killed; and three trainmen and about 30 passengers were injured. The excursion train, an extra, had followed the other, which was a scheduled train, too closely for several miles, the five-minute interval which should have been maintained at the stations having been neglected. At Souderton, about two miles north of Hatfield, a highway crossing flagman displayed a red flag and it was seen by the engineer, but he paid no heed to its warning. This collision was reported in the *Railroad Gazette* of Sept. 7 and 14.

2nd, on Pennsylvania railroad, at Branchport, N. J., a train of empty passenger cars ran into the rear of a preceding train of the same kind, badly damaging the engine and four cars. Two trainmen were injured.

2nd, 10 p. m., on Central of New Jersey, at Plainfield, N. J., a freight train broke in two and the rear portion afterward ran into the forward one, ditching 14 empty coal cars. Five tramps were injured.

2nd, 10 p. m., on Chesapeake Beach road, at Chesapeake Junction, Md., a passenger train ran over a misplaced switch and into some empty cars standing on the side track. The conductor was killed and one passenger and two trainmen were injured.

18th, on Louisville & Nashville, near Croakes, Ky., a passenger train was run into at the rear by a loaded freight car which escaped control and ran away at high speed down a grade. The two rear cars of the passenger train were wrecked. One passenger and two employees were injured.

21st, on Western Maryland, at Emory Grove, Md., a freight train standing at the station was run into at the rear by a passenger train, and the engine, caboose, and several cars were wrecked. Two trainmen were injured. It is said that a brakeman who was sent to flag the passenger train went into his caboose and fell asleep; and this brakeman was one of the persons injured.

24th, on Pennsylvania, near Lewistown Junction, Pa., an eastbound passenger train ran into the rear of a preceding freight, and the passenger engine, caboose and one freight car were wrecked. Three trainmen were injured. A permissive signal had been given to the passenger train at the entrance of the block section. There was a dense fog at the time.

27th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Dinsmore, Pa., rear collision of freight trains; one brakeman killed and one injured.

28th, on Philadelphia & Reading, near Sinking Spring, Pa., a freight train broke in two and the rear portion afterward ran into the forward one, badly damaging four cars. A man stealing a ride was killed and the conductor was injured.

And 15 others on 11 roads, involving 1 passenger train and 21 freight and other trains.

Butting.

7th, 11 p. m., on St. Louis Southwestern, at Trinidad, Texas, a passenger train ran over a misplaced switch and into a freight locomotive standing on the side track, badly damaging both engines and several freight cars. The freight engineer was killed and two other trainmen were injured.

9th, 1 a. m., on New York Central & Hudson River, at Corbett's Crossing, Pa., butting collision of freight trains 51 and 54, badly damaging both engines. One fireman was injured.

11th, on Southern Railway, near Ooltewah, Tenn., butting collision between eastbound passenger train No. 4 and westbound freight No. 47, wrecking both engines, the baggage car and two freight cars. Three trainmen were injured. It is said that the passenger train ran past an appointed meeting point.

12th, on Norfolk & Western, at St. Clair, Va., butting collision between a freight train and a work train, wrecking the engine of the freight and six cars of the work train, which was moving backward. Two employees were killed and two injured. It is said that the work train was not properly protected by flag.

15th, 1 a. m., on Boston & Maine, near The Weirs, N. H., butting collision of freight trains, making a bad wreck. Both locomotives and many cars were wrecked and the road was blocked all day. One fireman and one brakeman were killed and four other trainmen were injured. It is said that the northbound train ran past an appointed meeting point.

17th, on Pennsylvania, near Dunkirk, N. Y., butting collision between a passenger train and a freight; engine-

man and fireman injured. It is said that the collision was due to a misunderstanding of orders on the part of the freight.

20th, on Southern Pacific, at Haywards, Cal., a passenger train ran over a misplaced switch and into the head of a freight train standing on a side track. Both engines were badly damaged.

21st, 10 p. m., on Denver & Rio Grande, at Spike Buck, Col., butting collision of freight trains, due to the failure of an operator to deliver a telegraphic order. Four trainmen were injured.

22nd, 9 p. m., on Louisville & Nashville, at Saginaw, Ala., butting collision of freight trains, wrecking five cars and one engine. A brakeman was killed and two other trainmen were injured, one of them fatally. It is said that one of the trains having encroached on the time of the other had sent a flagman ahead, but that he was not far enough ahead.

25th, on Philadelphia & Reading, at Grantham, Pa., butting collision of freight trains, wrecking both engines and several cars. Three trainmen were killed and two others were injured. The conductor and engineer of one of the trains forgot a telegraphic order which had been delivered to them modifying an order previously received.

25th, on New York Central & Hudson River, near Williamsport, Pa., collision between a freight train and an empty engine, wrecking several cars. One fireman was injured.

29th, 1 a. m., on Burlington road, at Afton, Iowa, butting collision of freight trains, wrecking both engines and 10 cars, two of them containing cattle; one engineer, one fireman and one tramp killed.

30th, on Southern Pacific, near Dunsmuir, Cal., butting collision between a freight train and an empty engine, making a bad wreck; four trainmen injured.

And 4 others on 4 roads, involving 2 passenger and 6 freight and other trains.

Crossing and Miscellaneous.

5th, on Lehigh Valley, near Sayre, Pa., collision of freight trains, damaging caboose and six cars. One engine was ditched. One fireman was killed. There was a dense fog at the time.

6th, on Nashville, Chattanooga & St. Louis, near Vale, Tenn., collision between a freight train and a gravel train; one trainman injured.

7th, on Kings County Elevated road, at Tillary street, Brooklyn, N. Y., collision between a passenger train consisting of a locomotive and two cars, and another passenger train drawn by an electric motor, doing slight damage. The steam locomotive was nearly pushed off the elevated structure.

7th, 8 p. m., on Texas Midland, at Kaufman, Tex., passenger train No. 6, running at high speed, collided with a coal car which had run out of a siding and was standing on the main track, and the engine was badly damaged. The engineer and fireman jumped off and were injured.

9th, on New York Central & Hudson River, at Niagara Falls, N. Y., collision of passenger trains; three passengers and one trainman injured.

10th, on Pennsylvania road, at Camden, N. J., several cars of a freight train, being left insecurely braked, collided with the engine of the same train; one trainman injured.

12th, 3 a. m., on Pennsylvania road, near Harrisburg, Pa., collision of freight trains, wrecking several cars. A tramp was killed and two others were injured, one of them fatally.

15th, 1 a. m., on Central of New Jersey, at Bayonne, N. J., collision between a freight train and an empty engine, wrecking several cars. A tramp was killed and eight trainmen were injured.

16th, 5 a. m., on Illinois Central, at Louisville, Ky., collision of switching trains, one of which was made up of passenger cars and the other of freight; two trainmen injured.

17th, on Lake Erie & Western, near Red Key, Ind., an eastbound passenger train ran over a misplaced switch and into a freight train standing on the side track, badly damaging one engine and wrecking the baggage car. The passenger fireman was killed and one engineer and two tramps were injured.

18th, on Southern Pacific, at Haywards, Cal., several freight cars which escaped control while being switched ran away down a grade and collided with some standing freight cars. Two men loading freight were injured.

19th, at Corriganville, Md., a freight train of the Baltimore & Ohio ran into a freight of the Cumberland & Pennsylvania, at the crossing of the two roads, wrecking an engine and several cars. The Baltimore & Ohio engineer was injured.

24th, on Philadelphia & Reading, at 17th street, Philadelphia, collision of switching freight trains; one brakeman fatally injured.

25th, 5 a. m., on Mobile & Ohio, near Jackson, Tenn., a northbound freight train collided with some empty cars which had escaped control at Jackson and were running away down grade at high speed. The engine and many cars were wrecked and the engineer and fireman were injured.

28th, on Detroit, Grand Haven & Milwaukee, at Durand, Mich., collision between a freight train and a switching engine; engineer and fireman killed, one brakeman injured. The wreck took fire and 24 loaded cars were burned up.

28th, on Northern Pacific, at South Tacoma, Wash., collision between a freight train and a switching engine; fireman injured.

And 33 others on 24 roads, involving 6 passenger and 52 freight and other trains.

DERAILMENTS.

Defects of Roadway.

24th, on Chicago, Peoria & St. Louis, near Springfield, Ill., a passenger train was derailed by a broken rail and the engine fell against a passenger train of the Chicago & Alton moving in the same direction on a parallel track. Both engines were overturned and wrecked and a house nearby was badly damaged. One engineer and one fireman were killed and a brakeman was injured.

And 3 others on 3 roads, involving 1 passenger train and 2 freight and other trains.

Defects of Equipment.

2nd, on Central of New Jersey, at Plainfield, N. J., several cars in a freight train were derailed by the automatic application of the air-brakes and 10 cars were badly damaged. Two tramps were injured.

11th, 3 a. m., on Iron Mountain road, near Keswick, Cal., a freight train descending a steep grade was derailed by a brake-beam which dropped on the track and five cars of ore fell down a bank. A brakeman was injured.

12th, on Illinois Central, at Mounds, Ill., a passenger train was derailed by a broken wheel and the rear passenger car was thrown violently against a switching engine standing on a side track, wrecking one end of the car. Nine passengers were killed and four were seriously injured.

17th, on Georgia road, near Hillman, Ga., a mixed train was derailed and five freight cars and one passenger car were overturned. It is said that the derailment was due to the breaking of an axle of a car loaded with lumber.

20th, on Central of New Jersey, near Bayonne, N. J., a passenger train running at good speed was derailed by the breaking of one of the trucks and two passenger cars were thrown crosswise of the track. One passenger was injured.

24th, on Philadelphia & Reading, near Tamaqua, Pa., a freight train was derailed by a broken wheel and 10 cars were wrecked. The conductor was fatally injured.

26th, on Norfolk & Western, near Radford, Va., a freight train was derailed by a broken flange and seven loaded cars were wrecked. A tramp stealing a ride was killed.

30th, on Atchison, Topeka & Santa Fe, at Waterloo, Okla. T., a passenger train was derailed by the breaking of a truck of the tender and the smoking car was overturned and wrecked. Two passengers were killed and 11 were injured.

And 11 others on 10 roads, involving 3 passenger and 9 freight and other trains.

Negligence in Operating.

2nd, on Philadelphia & Reading, at Reikert, Pa., the locomotive of a freight train was derailed at a misplaced switch and the fireman was fatally injured.

4th, 2 a. m., on Chateaugay Railway, near Cadyville, N. Y., a freight train consisting of an engine and nine cars became uncontrollable on a steep grade and ran several miles at very high speed. The cars were derailed at various places along the line for a distance of half a mile. The engineman, fireman and all the rest of the crew escaped by getting into the caboose and detaching it from the rest of the train.

10th, on Chicago & Northwestern, at Appleton, Wis., a passenger train was derailed at a misplaced switch and the fireman and a tramp were injured.

23rd, on Atchison, Topeka & Santa Fe, at Point Richmond, Cal., a locomotive just detached from a passenger train and backing into a side track on the wharf at the terminus of the road broke through the trestle supporting the track and fell into the bay. The fireman was drowned. It is said that the engine was on a track which was unsafe for heavy loads and that a notice of its condition had been posted for the information of enginemen.

27th, on Norfolk & Western, at Wyndale, Va., a number of freight cars escaped control while being switched and ran at high speed down grade and were derailed and wrecked. A brakeman was injured.

27th, on Duluth, South Shore & Atlantic, at L'Anse, Mich., a freight train became uncontrollable on a steep grade and ran at high speed to a curve near the station, where it was derailed. The engine and several cars ran through the station building, wrecking it completely and setting it afire. The engineman and fireman were injured. It is said that this is the third building which has been destroyed on this spot by a runaway train.

And 9 others on 8 roads, involving 1 passenger train and 8 freight and other trains.

Unforeseen Obstructions.

2nd, on Atlantic City road, near Radix, N. J., a passenger train was derailed at a switch which had been maliciously misplaced, and the engine was overturned. Three passengers and the fireman were injured, the latter seriously.

5th, on New York Central & Hudson River, near Winburn, Pa., a freight train was derailed by running over some cattle, and the engine and six cars were wrecked. The engineman, fireman and one brakeman were killed.

8th, 7 p. m., on Gulf, Colorado & Santa Fe, near Alvin, Tex., a passenger train consisting of an engine and four cars was blown off the track by the great storm prevailing at that time and fell into the ditch. One passenger was killed and 10 passengers and four trainmen were injured.

24th, on Illinois Central, at Council Bluffs, Iowa, a switching engine was derailed by running into a street car at the Fourteenth street crossing. The motorman was injured.

And 2 others, involving 2 freight trains.

Unexplained.

1st, on Southern Pacific, near Sims, Cal., a freight train was derailed and 10 cars were wrecked. A tramp was injured.

3rd, on Chicago & Northwestern, near Pecatonica, Ill., a passenger train was derailed and the engine and several cars fell down a bank. The engineman was fatally scalded and about a dozen passengers were injured.

9th, 1 a. m., on Missouri, Kansas & Texas, near Sayers, Tex., a passenger train was derailed and one passenger was injured.

11th, on Cleveland & Pittsburgh, near East Liverpool, Ohio, a freight train was derailed and nine cars were ditched. One of the cars, containing gasoline, exploded while the wreckers were at work on it, and 15 employees were injured, two of them probably fatally.

14th, on Atchison, Topeka & Santa Fe, near Sulzbacher, N. Mex., a freight train consisting of two engines and about 30 cars was derailed and the engines and 23 cars fell down a bank. A brakeman was killed.

15th, on Atlantic Coast Line, near Ellenton, Ga., two cars of a passenger train were derailed; three passengers and two trainmen injured.

21st, on Cincinnati, New Orleans & Texas Pacific, at Sadieville, Ky., a freight train was derailed and badly wrecked. Five tramps were killed and four injured.

24th, on Southern Pacific, at Gartney, Utah, passenger train No. 14 was derailed while running at full speed around a curve and all of the nine cars were ditched. One passenger was killed and 15 were injured.

27th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Carnegie, Pa., six cars of a freight train were derailed and a brakeman was injured.

And 28 others on 23 roads, involving 3 passenger and 25 freight and other trains.

OTHER ACCIDENTS.

8th, on Toledo & Ohio Central, near Moxahala, Ohio, a freight train was damaged by a cave-in in a tunnel and a brakeman was injured.

16th, on Atchison, Topeka & Santa Fe, at Chicago, Ill., a switching locomotive was wrecked by the explosion of its boiler and the engineman and fireman were injured. The force of the explosion drove the engine forward some distance and it struck and wrecked two freight cars.

And 4 others on 3 roads, involving 4 passenger trains.

A summary will be found in another column.

Judge Lowell on the Federal Labor Law.

Mr. Hugh J. Hill, Chief Train Dispatcher of the Taunton Division of the New York, New Haven & Hartford, was tried in the United States District Court at Boston last week on the charge of violating the Federal statute which prohibits unjust or discriminating treatment of employees; but the jury failed to agree on a verdict. Hill, together with Superintendent A. L. Ackley, was indicted in 1899 for dismissing Peter J. Galligan, a telegraph operator in the office of the Train Dispatcher at Taunton, but Mr. Ackley appears not to have been put on trial. Galligan was a member of the Order of Railway Telegraphers, and it is understood that that brotherhood prosecutes suit. The indictment was brought under Section 10 of the law of June 1, 1898, forbidding an officer of a railroad to discriminate against or threaten an employee in the train service because of membership in a labor organization. From the evidence as published in the Boston papers it appears that Hill had had several conversations with Galligan, and also with other employees, giving them to understand in a general way that the road disapproved their membership in the brotherhood, and warning them that they might be dismissed on that account; but when the dismissal finally came it was made on the ground that it was necessary to reduce the force. Counsel for the railroad claims that not for six months after his discharge did Galligan make any complaint; it was also alleged that Galligan's memoranda of conversations held with Hill must have been cooked up some time after the actual occurrences. A principal feature of the defense of the road was that Galligan was not employed in the train service; but Judge Lowell, in his charge to the jury, said, among other things:

"In considering this case, it is necessary that you should understand what is meant by the term 'railroad train service,' and you are to take the definition as I give it to you. If Galligan, in the regular course of his employment, took from the telegraph instrument messages communicating to the Train Dispatcher's office the arrival and departure of trains, and in so doing, when occasion required, communicated those messages to the Train Dispatchers, thereby enabling them, in person or by direction, to transmit by telegraph orders directing the movements of the trains, in accordance with which the trains were operated, then Galligan was engaged in train operation or service, even though the performance of such duties occupied but a portion of his time."

The Judge also charged that if Hill actually made the discharge he must be held responsible for it, even though his act was performed by the order of a higher officer; that if Galligan's membership in a labor organization was a material reason for the discharge the jury must find the defendant guilty, but if reduction of force was the reason, the verdict must be not guilty; so that, finally,

"To find the defendant guilty it will be necessary for you to determine that Galligan was in the railroad train service within the definition I have given you, for if he was not, the case drops there; secondly, that Galligan was discharged by Hill's own act, and, thirdly, that Galligan was discharged because he was a member of a labor organization."

The Central London (Underground) Railroad.

The most generally talked-of railroad in London at present is the Central London, the underground line recently completed from the Bank of England to Shepherd's Bush, 5¾ miles. This road was described in the *Railroad Gazette* of May 25 and July 13 last, the earlier article containing matter also concerning the other London underground lines. Adverse as well as favorable criticisms have been made on the road, by the people who have used it. The uniform fare for the whole distance, 2 pence, is one of the principal features complained of. The feeling of the public concerning this feature is indicated by the nickname, the "tuppenny tube," which the tunnel now goes by. Fares on the omnibuses and surface lines generally in London are graduated according to distance, many short trips being rated at only one penny. Concerning the Central London, a correspondent says:

"The tunnels and stations on the Central London for brightness, lightness and cleanliness are to be contrasted with the conditions prevailing on the Metropolitan & District underground lines now known as the 'Sewer.' The electric lighting of the cars is all that can be desired. It is much better than on any English railroad that I know, not excepting the City & South London. The stations also are well lighted by both arc and incandescent lamps from a 500-volt three-wire system. The lighting feeders are entirely separate from the power circuits. You can comfortably read any ordinary document in the trains by the light from the clusters of incandescents in the car roof.

"The lifts work easily, but not always at convenient times; there is too much waiting to fill up lifts instead of each lift taking a reasonable number. The traffic is not sufficient to keep the trains full during certain hours in the day, but as the line is becoming more known the day traffic is improving. In the morning from 8 to 10:30 the overcrowding is greatly complained about, and in the evening from 5 to 7 is the heaviest time. All sorts of wild suggestions have been made by the public. One writer wanted all trains to run one way (in both tunnels) at these heaviest traffic times! The line is supplying a great want, and the omnibuses along the route are feeling it; their rates are now lowered to meet the competition. The Metropolitan Railway is altogether out of favor since the Central London started running.

"The trains consist of seven carriages with a separate locomotive. A 2½-minute service of trains is now being given and the maximum speed between stations is about

25 miles an hour. Each train seats 336 passengers and weighs 105 tons loaded, without the locomotive. The average stay at each station is about 20 seconds. The average speed, including stops, is 14 miles an hour."

Grand Central Station—New York.

The repairs and changes on the Grand Central Station, New York City, which have been going on for the past year or more, are now so far completed that the new general waiting room is open for use. This room, about 90 ft. x 180 ft., and 36 ft. high, designed by Mr. Samuel H. H. Jr., was described and illustrated in the *Railroad Gazette* of June 23, 1899. The room is inside the great train shed and is covered by the high arched roof; and as there are no unobstructed windows in the sides the situation is rather unfavorable, but the room is said to be sufficiently light, and the promise, in the architect's sketch, of a handsome rotunda is fully realized. The wainscoting, about 7 ft. high, is of white marble and the walls above this are also white, so that the tone of the room as a whole is light and cheerful. The skylights have but little color in them and the principal relief colors are those of the 12 mahogany settees and of the green metal work at the doors leading to, the train platforms. To the observer the settees seem to fill the central portion of the room, as they are about 25 ft. long and have very high backs, but they are placed a good distance apart, so that they will not obstruct the movements of a large crowd. The seats are placed back to back and the space between each two backs contains steam radiators, the covering at the top being a perforated iron plate.

The electric lighting of this room is by means of incandescent lamps, in clusters, concealed by glass globes, fixed at intervals in the transverse beams which support the skylights, and by single 16-c.p. lights placed close together around the entire room above the cornice. Besides these there will be reading lights, on standards, at both ends of each pair of settees. The corridors, ladies' room, smoking room, etc., are lighted by chandeliers of original design. All these chandelier lights are enclosed in ground glass globes, making them uniformly white.

The new baggage room and the restaurant are yet to be made. The transverse subway for baggage at the north end of the train shed is done, but the lifts are not finished. The new tracks and platforms are partly finished.

The Life of Rails.

In the August issue of the Bulletin of the International Railway Congress Mr. J. W. Post, Divisional Chief Engineer of the Netherlands State Railroads has a note on the life and wear of rails. The observations made by the German Railroad Union, extending over 18 years and covering 486 experimental sections of track, show that per million tons carried there is a loss of .0036 inch in the height of the rail and of .007 sq. in. in the cross section. The decimals are carried out two places further than we give them here, but it strikes us that they are carried about one place too far even now. From diagrams collected Mr. Post concludes that as a rule the wear increases as the radius of the curve decreases. Concerning later observations made to ascertain the relative wearing qualities of rail of different steel—namely, Bessemer, Thomas, Martin, etc.—Mr. Post says that they have not continued long enough to warrant generalization. He sums up his general opinion as follows:

1. During the last twenty years a considerable amount of work has been done in investigating the wear and deterioration of rails.

2. This work has so far not given any results which enable a definite answer to be given to the question, What kind of metal is the best for rails, from the points of view of—

(a) Regular wear of the crown.

(b) Local wear.

(c) Deterioration (cracks, exfoliations, fracture).

3. This is chiefly explained by the fact that sufficient attention has not been paid in the large majority of cases to the nature of the metal; moreover the metal has been assumed to be very homogeneous, and it very rarely has that quality.

4. It appears desirable to collect further data on the wear and deterioration of rails, taking into consideration the physical properties of the steel, its chemical composition, and the differences of texture which often exist in different parts of the cross section and length.

5. It would also be useful to determine what effect the presence of certain metals (nickel, chromium, etc.) has on the physical properties of the steel and what effect the addition of certain metals—e. g., aluminum—to the ladle has on the homogeneity of the metal obtained.

6. These investigations should make it possible to draw up specifications for rails which are more durable than the majority of the present rails.

7. Etching and microscopic methods may throw a great deal of light on the subject.

The Prussian State Railroads, in view of the coal famine, have placed imported coal under the "raw material rates," which is a considerable reduction in freight charges for points at some distance from the sea. Rates have been made heretofore with a view to some protection of the national coal producers; but now that even at enormously increased prices it is difficult for many industries to get a sufficient supply, it is felt that the public welfare demands a policy which will increase the supply of fuel. The new rates, it is announced, will apply for at least two years.



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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

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Net earnings for August on 135 roads, according to *The Chronicle*, were \$34,005,748, which is a gain of \$2,008,647 or 6.28 per cent. over the net of the same roads last year. This increase follows a gain of \$5,004,870, or nearly 20 per cent., in the preceding year. There was an increase of \$6,915,392 or 7.53 per cent. in the gross earnings. Twenty-eight roads reported increases in net earnings of more than \$30,000, and 16 roads reported similar decreases. The Pennsylvania Lines East and West led in the increases with \$646,300; then followed the Atchison, Topeka & Santa Fe with \$327,875; the Reading, \$175,615; the Chesapeake & Ohio, \$172,477, and the Chicago, Milwaukee & St. Paul, \$166,508. The largest decrease was of the Mexican Central, \$169,607. The Illinois Central showed a loss of \$137,390 and the Southern Pacific, \$121,430.

Passenger traffic in this country has grown greatly since 1897, but has, of course, not kept pace with freight traffic. Travel reached its maximum here in the year of the Chicago World's Fair, covered in the Inter-State Commission report for the year ending with June, 1894. The next year, a year of great business depression, it was one-seventh less, and two years later, in 1897, it was but little greater. In millions of passenger miles it has been for the last five years:

1894.	1895.	1896.	1897.	1898.	1899.
14,289	12,188	13,049	12,257	13,380	14,591

Thus since 1897 there has been an increase of 19 per cent. (freight, 30, but the gain over 1892 is only 9 per cent., which is less than the increase in population. Nor is there any notable gain in efficiency in passenger transportation, as there has been in freight. Passengers must be carried where they want to go, and cannot be held to make large trains and so save expenses. The average passenger-train load is painfully small, and it does not grow. For ten years it has varied between 37 and 44 passengers, the latter in the World's Fair year, and was 41 in 1899—not a full car-load.

Mr. Delano at the last meeting of the Western Railway Club gave emphasis to a matter which is worthy of more than passing attention. In his discussion of a paper on cast-iron car wheels, he called attention to the apparent inability of Europeans to make use of such wheels, and to the fact that while a very large percentage of all American traffic is carried by wheels now costing less than one cent a pound, the traffic of Europe depends upon the use of steel wheels costing many times this amount. He expressed the belief that in this fact lies a fine tribute to the skill of the American engineer. In this country the cast-iron wheel has been subjected to many refining influences. Railroad authorities have kept elaborate records and have resorted to careful and systematic inspections for the purpose of determining the service derived from them. They have devised tests and drawn specifications which sometimes have seemed unnecessarily severe, but so successful have manufacturers been in meeting these demands that each new requirement has served as a stepping stone to

better practice. In accomplishing this, manufacturers have been obliged to deal with many different details entering into the process of wheel making. While not neglecting the larger problems such as are involved in the construction of chills and the composition of metals entering into the make-up of wheels, they have discovered that even a correct leveling of the mold, the temperature at which the metal is poured, and the rapidity of the pouring are all elements having a part in the making of a good car wheel. It is by giving attention to such details as these that he has been able to make a cast-iron wheel which is as safe and as satisfactory for its service as the more costly steel wheel.

Massachusetts and Minnesota.

Agreements on the part of railroads to comply with an expressed or understood wish of the public, without official compulsion on the part of the State, may possibly become fashionable. The New York Central told the people of Massachusetts that in leasing the Boston & Albany it would not use Massachusetts profits for expenditures in New York, and now the Northern Pacific has made a written agreement with the Governor of Minnesota to conduct the St. Paul & Duluth, which it has recently bought, in substantially the same manner that it has been managed heretofore. Two swallows do not make a summer; but these incidents are sufficiently unusual to be made note of. The most common railroad policy in such matters in the past has been to take everything that the law allows, on the assumption that the State would be sure to oppress the railroad, in one way or another, as soon as the legislative agitators should discover a way.

As the reader already knows, the Northern Pacific has lately bought a controlling interest in the St. Paul & Duluth. The Railroad Commissioners of Minnesota, fearing that this absorption of the small road by the greater one would be inimical to the interests of the State, at once took measures to have the bargain declared illegal, and in this effort they enlisted the co-operation of the Governor and the Attorney-General. The chief ground for the proceeding was the alleged suppression of competition, as the Northern Pacific competed with the St. Paul & Duluth from Cloquet to Duluth, though by a roundabout line. But the real ground of the fear entertained by the State officials was the possibility that the Northern Pacific might practically change the northern terminus of its new line from Duluth to Superior, which is in another State, and thus make a large part of the traffic interstate, so taking it out of the jurisdiction of the Minnesota officials as regards regulation of rates. But after a number of long conferences, the officials of the State agreed to withdraw their suit, "without prejudice," the railroad having agreed to forever maintain the St. Paul & Duluth as though it had remained independent. As reported in the *Minneapolis Times*, the Northern Pacific people aver that they have no desire to escape State control, and they now enter into an agreement to forever maintain adequate terminal facilities within the State of Minnesota at or near Duluth. Another clause in the agreement rehearses that the line of the Northern Pacific in Minnesota is subject to all the obligations expressed in the statutes of the State applying to such a railroad; and the company agrees, further, to have the Duluth line treated as an independent line in all questions of rates.

In this case, as in that of the Boston & Albany, the large road appears to have desired to acquire the smaller one for the single purpose of making sure that some rival interest should not get it; and the agreements (in both cases) to not try to accomplish some other purpose has every appearance of reasonableness. The bad effect of a refusal to enter into such an agreement lies in the feeling of uncertainty thus engendered in the minds of State officials and legislators. Even if it be made ever so clear to them that a railroad will be powerless to injure the people, or that it will have a constant motive not to injure them, the vague feeling that many possibilities of harm may lie beneath the surface of things keeps alive a pronounced suspicion that the railroads intend to raise rates or do some other injury to the public. A single definite promise, therefore, allays a multitude of fears. And, of course, this amelioration of suspicion must be the main benefit from any agreement of this kind; for no State official or any one else can tell what may be wanted of the railroad ten years hence. The people of Minnesota may soon find that the maintenance of the St. Paul & Duluth as an independent line is of less benefit to them than some other arrangement would be.

It seems to us that the officers of the New York Central and of the Northern Pacific have in these

cases manifested a true public spirit. While in terms their acts are spoken of as "agreements," they have in reality taken a definite position independently; for the action or promises of a Governor or a legislature do not bind the state. A state cannot be sued, neither can it be made to carry out its promises, except (sometimes) by indirect methods, while a corporation is bound by the acts of its officers. Even if this statement be subject, in some circumstances, to modification, the fact remains that legislatures will do with the railroads as they please, at all times when the members can agree as to what they wish to do, while a railroad which has promised to restrict its liberty in any way is pretty sure to be rigidly held to its word. People do not forget such a promise.

Men versus Machines in Block-Signaling.

The British Board of Trade has just issued the report of Colonel Yorke, its inspector, on a fatal collision of passenger trains, in a tunnel at Glasgow, which was due to the culpable action of a signalman in hastily disconnecting a Sykes lock; and *The Engineer* (London) comes out in an editorial (p. 267), emphasizing the old and somewhat fatalistic doctrine that passengers' lives are wholly dependent on the vigilance of railroad employees, and written throughout in a tone which condemns electrical safeguards in railroad signaling as always and inevitably dangerous. It seems to us that this is taking a position which is almost absurd in its oneness. As the inspectors of the Board of Trade have only recently taken a decided stand in favor of lock-and-block apparatus, it will be a matter for regret if, by the influence of *The Engineer* or for any other reason, the English public shall assume an attitude which is likely to weaken the determination of the inspectors to require of the railroads the best safeguards—whether mechanical or clerical or in the management of the personnel—that can be applied to their block signals. We shall therefore point out one or two features of this case which the article before us ignores or distorts.

The collision was in the tunnel of the North British Railway, at Glasgow, about six o'clock on the morning of March 28. The tunnel is about 3,300 feet long and it lies between Queen street and Charing Cross stations, Queen street west signal box being near the east end of the tunnel and Charing Cross being near the west end. A westbound passenger train carrying about 1,000 workmen going to the Singer Sewing Machine Works was stopped in the middle of the tunnel by the automatic application of the Westinghouse air-brakes, and another train, similarly loaded, ran into it in the rear. Seven persons were killed and 30 or more injured. The block signal apparatus was fitted with Sykes locks. It appears that Rentoul, signalman at the west end, was asked to clear the Queen street signal for the second train; and, finding his plunger locked, at once jumped to the conclusion that the first train had passed, but had failed to unlock him; he then used the emergency key, unlocked himself and cleared the Queen street signal. The second train then came on and the collision followed. The signal cabins are connected by telephone and Milne, at Queen street, when he did not get his signal promptly cleared, spoke to Rentoul over the telephone and got the response already mentioned.

It appears from the inspector's report that the locks which should be worked by the passage of the train were not cased in, so that any person in the cabin could tamper with them; and as Rentoul admits having removed the lock on previous occasions Col. Yorke thinks it extremely probable that he has been in the habit of doing this whenever he thought he could thereby save himself trouble. The regulations require all failures of this apparatus to be promptly reported, but the book on which these reports should be recorded contains no entries regarding them, and Col. Yorke concludes that there has been negligence in this respect. He thinks that the emergency key might be dispensed with to advantage; but if not, he would arrange it so that the signalman could not use it without the knowledge and consent of some person in authority. The cause of the apparently automatic application of the air-brakes was not discovered, and the inspector thinks that it was the fault of the engineman and not of the apparatus.

The Engineer's despondent view appears to be based mainly on its conclusion that "every possible precaution had been taken by the railway company to secure the safety of trains;" but it then goes on to base its chief charge against the signaling on the assertion that one of these precautions was not a precaution. "A mechanical lock intended to act as a guard on the actions of a signalman, but which he can get rid of at any moment, is no guard at all." Discussing the question whether such a guard could be arranged so as to be out of the reach of the signalman the com-

clusion is reached that so rigid a check could not be used on a busy railroad; so, therefore, the final verdict must be that "the safety of passengers depends, and must depend, on the vigilance of railway servants."

We need not stop to recall any of the hundreds of disasters in former years which have resulted from bald dependence on the "vigilance of servants," where simple and obvious mechanical or electrical safeguards, since widely used, would have saved lives and property. Nor need we remind the reader that we recognize the vital importance of intelligent human care, whatever appliances are used in signaling. The illogical basis of the English editor's discouragement is apparent when we give due attention to the two points which he so briefly slurs over; the defect in the discipline and the alleged impossibility of employing a rigid check without causing intolerable delays to trains.

Using as our chief argument the experience of the busiest American railroads we might urge as the most reasonable, scientific and economical remedy for this Glasgow failure, the automatic rail-circuit block system. Automatic signals have now been used on the Pennsylvania railroad 16 years and extensively for five years. With automatic systems the human element is eliminated, in the operation of the signals, except as regards inspection; and inspection has been brought to such a high state of perfection that the chief concern of signal engineers now is not to avoid giving false clear signals—that danger has been satisfactorily dealt with—but to avoid the other kind; non-dangerous failures, which are mere annoyances. That these annoyances are not numerous is evident from the fact that trains follow one another as closely as the length of the block sections will permit, for hours every day, on the busiest lines entering New York, Boston, Philadelphia, Pittsburg and Chicago. These signals are used extensively by a dozen large roads; but we have mentioned the Pennsylvania particularly because that company's testimony should be more acceptable to our English cousins by reason of its having used the manual block system for years before adopting the automatic. If it be said that automatic signals have not been used much in long tunnels like that at Glasgow, we might answer that, on *The Engineer's* own theory of the dangers of human weakness, it would be an improvement to equip that tunnel line with automatic signals and set watchmen to see that the enginemen obeyed the signals and that the signals invariably performed their functions.

But we need not confine ourselves to the automatic system as our only remedy. The fault here disclosed in the controlled manual is not of a kind which it is fair to class as incurable. The weakness of the conclusion which we are criticising lies in the assumption that the hasty mental habits of this signalman and the negligence of his superiors in not correcting his obvious and easily discovered negligence will be hard to correct. From all the evidence it seems to us that the remedies are very plain. A signalman who thus jumps at conclusions must have some defect of mental habit which is easily discoverable. A superintendent who allows emergency apparatus to be repeatedly used, without requiring faithful reports of the circumstances, is very negligent. It would be culpable in the general manager not to correct these things, howsoever many electrical safeguards he might throw away on the advice of *The Engineer*.

The point in our contemporary's argument on which the most emphasis is placed is, perhaps, that in which it is claimed that satisfactory safety appliances can, possibly, be devised, but cannot be used on busy lines. This is an argument that can be tested only by experience on the busy lines themselves; but in view of the enormous interests involved in safe and efficient block signaling, it would be decidedly unwise to accept the results of such a test as conclusive unless the discipline were first class. A busy road, well managed otherwise, the best appliances and the most competent personnel, all three, are necessary to a satisfactory conclusion.

September Accidents.

Our record of train accidents in September, given in this number, includes 90 collisions, 81 derailments and 6 other accidents, a total of 177 accidents, in which 68 persons were killed and 196 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

	Collisions.	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two...	10	0	0	0	10
Misplaced switch	1	2	5	8	
Failure to give or observe signal	3	2	6	11	

Mistake in giving or understanding orders	0	6	0	6
Miscellaneous	3	2	13	18
Unexplained	7	5	25	37
Total	24	17	49	90

Derailments.

Broken rail	2	Misplaced switch	3
Defective switch	1	Derailing switch	1
Soft roadbed	1	Bad switching	3
Broken wheel	3	Bad loading	1
Broken axle	7	Runaway	6
Broken truck	2	Disregard of bulletin order ..	1
Fallen brake-beam	2	Animals on track	1
Brake hose burst	1	Wind	1
Failure of drawbar	1	Malicious obstruction	3
Failure of drawbar and automatic application of air-brakes ..	1	Accidental obstruction	1
		Unexplained	37
		Total	81

Other Accidents.

Boiler explosion	1
Cars burned while running	1
Other causes	4
Total number of accidents	177

A general classification shows:

	Col-lisions.	Derail-ments.	Other acci-dents.	Total.	P. c.
Defects of road	0	4	0	4	3
Defects of equipment	10	19	1	30	16
Negligence in operating	43	15	1	59	33
Unforeseen obstructions	0	6	4	10	6
Unexplained	37	37	0	74	42
Total	90	81	6	177	100

The casualties may be divided as follows:

	Col-lisions.	Derail-ments.	Other acci-dents.	Total.
Killed—				
Employees	19	12	0	31
Passengers	13	13	0	26
Others	5	6	0	11
Total	37	31	0	68
Injured—				
Employees	62	13	3	78
Passengers	35	64	0	99
Others	10	9	0	19
Total	107	86	3	196

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. in-jured.	Emp. killed.	Emp. in-jured.
Defects of road	0	3	4	1
Defects of equipment	11	16	1	3
Negligence in operating	13	35	21	65
Unforeseen obstructions and maliciousness	1	13	3	6
Unexplained	1	32	2	3
Total	26	99	31	78

Thirty-one accidents caused the death of one or more persons each, and 33 caused injury but not death, leaving 113 (64 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with September of the previous five years shows:

	1900.	1899.	1898.	1897.	1896.	1895.
Collisions	90	116	99	77	45	50
Derailments	81	119	82	70	64	54
Other accidents	6	5	4	0	7	4
Total accidents	177	231	185	147	116	108
Employees killed	31	65	33	39	30	25
Others killed	37	28	17	33	24	13
Employees injured	78	135	78	68	70	53
Others injured	118	91	50	97	109	126

Average per day:						
Accidents	5.73	7.70	6.17	4.90	3.87	3.60
Killed	2.27	3.10	1.67	2.40	2.13	1.27
Injured	6.52	7.51	4.27	5.50	5.97	5.97

Average per accident:						
Killed	0.38	0.40	0.27	0.49	0.47	0.35
Injured	1.11	0.98	0.69	1.12	1.54	1.65

The high record of fatalities to passengers in September is due chiefly to two accidents, the collision at Hatfield, Pa., on the 2nd, and the derailment at Mounds, Ill., on the 12th. The Hatfield collision has already been discussed in these columns. The accounts of the accident at Mounds seem to indicate that the circumstances were of a very common kind, but the number of passengers killed was large, and all of the victims were women except one. The derailment at Gartney, Utah, on the 24th, appears to be unexplained. The train was running at full speed on an easy curve. The wreck at Alvin, Tex., on the 8th, though a disaster in itself, received but little notice, from the fact that it was but an incident of the great storm which devastated Galveston and which caused calamities at many other places.

On the Esquimault & Nanaimo, near Ladysmith, B. C., on the 15th, there was a butting collision of freight trains on a trestle bridge in a hollow, both trains having been running on descending grades immediately before the collision. Three trainmen and a man riding on one of the engines were killed.

The newspapers report 18 electric car accidents in September, in which two persons were killed and 105 injured. One of these cases was that of a street car on a crossing at Council Bluffs on the 24th. This accident is included in the train accident record, as the steam locomotive which ran into the street car was itself derailed. One of the electric road accidents was a butting collision in which one of the trains was a freight made up of 30 cars. In another case it was a freight car that was derailed. At Wichita, Kan., on the 30th, a street car plunged from the track into Chisolm creek, and about thirty persons were hurt. It was thought three of them would die.

In looking over the annual report of the Hocking Valley for the year ending June 30 we find this statement: "As anticipated in the report for the four months ending June 30, 1899, the average number of tons of freight per train-mile (at that time 522 tons) has been increased with

the use of heavier equipment. For this fiscal year it is 646 tons." This road carried a total of 805,317,681 ton-miles in the year, or at the rate of 233,000 ton-miles per mile of road worked. The freight train-miles amounted to 1,246,020, and dividing ton-miles by train-miles we get the quotient 646, which is surely an extraordinary train-load. The freight train earnings per mile amounted to \$2.89, although the average ton-mile rate was but 4.48 mills. Bituminous coal furnished 58.71 per cent. of all the tonnage, and including coke, ore, stone, sand and the like and a very little anthracite coal, we find that products of mines furnished 79.3 per cent. of the total tonnage. Merchandise and miscellaneous commodities only gave 3.43 per cent. and the products of agriculture 4.6 per cent. The gross earnings for the year amounted to \$4,417,267 and the net earnings to \$1,776,060. This was the first full year of the operation of the company since the reorganization and gross earnings increased \$1,543,000 and net \$861,545, or 94 per cent.

Judge Lowell, of the United States District Court in Massachusetts, holds that a telegraph operator working in a train despatcher's office is engaged in the train service of a railroad; and under the Federal law of June 1, 1898, it is as much of a crime to dismiss such a person on account of his relations to a labor union as it would be to dismiss a conductor or an engineman. To most railroad men this will seem rather illogical. If the reasoning is sound, the office boy who carries the message from the operator's desk to the despatcher's should also be treated as working in the train service. The weakness of the argument, from the railroad point of view, arises from the consideration, which no doubt was an important factor in securing favorable votes for this law in Congress, that only for the benefit of men performing important duties like those of a conductor, engineman, fireman or brakeman, would it be justifiable to provide such legislative protection from dismissal. To receive or send messages for a despatcher requires little, if any, more distinctively railroad knowledge than to count money in the office of a railroad treasurer. But a sleeping car porter or a water boy may as fairly be called a member of the train-crew as a brakeman or baggage-man, so that if a despatcher is in the train service it is quite likely that other judges will agree with Judge Lowell that a despatcher's helper is also in it. Unfortunately, the case which came before Judge Lowell, reported in another column, did not come to a decision; so that a ruling by a full bench on this interesting point is not likely to be had for a long time to come.

As an indication of the importance attributed to Russian railroad affairs in certain quarters, it may be mentioned that in the July-August number of the *Archiv für Eisenbahnwesen*, the railroad review published by the Prussian Ministry of Public Works, just about one-half of the space is occupied by three articles, one on the "Economic Importance of the Siberian Railroad," which covers 49 pages and is the third instalment of an article not yet finished, which, altogether, will make a book respectable in size, and much more than respectable for research and fulness of information; a second on "The Railroads of the Russian Empire Down to the Year 1892," and a third on "Freight Traffic on the Russian Railroads, 1892 to 1896." It is true this is an unusual amount of space for things Russian even in the *Archiv*, but it has always been the best source of information on Russian railroads to those ignorant of the Russian language. And it is doubtless good policy for Germany to keep itself familiar with these affairs. Russia is its next-door neighbor, with which, in spite of the latter's strong protective policy, it must have intimate commercial relations. Russia, too, is the one neighbor which has room for great industrial transformation; which, if wisely conducted so as to increase the national wealth, will be a gain to the rest of the world, and most of all perhaps to Germany. If the average Russian consumed as much of the products of industry as the average German, there would be a tremendous increase in Russia's interchanges with other countries, however much Russia's own manufactures might have grown.

The new Hungarian zone tariff which we described June 1 last, and which was then ordered to take effect July 1, has been withdrawn, and the old tariff remains in force. It was first announced that the introduction of the new tariff was "postponed," but as the summer passed without further action it is suspected that the postponement is indefinite.

The Russian State Railroads at the beginning of this year had an aggregate extent of 20,032 miles, and increased 1,272 miles during 1899. Their gross earnings last year were \$178,957,512, which was 4½ per cent. more than in 1898, and \$8,932 per mile, which is less than in 1898. The working expenses were 60½ per cent. of the receipts and the net earnings were \$3,528 per mile. Per train mile the earnings were \$1.53 and the expenses 93 cents. The Trans-Caspian Railroad, from the Caspian to Samarcand, 942 miles, earned in 1899 one-sixth less gross and a third less net than the year before, when it carried quantities of material for extensions. Last year its earnings were \$3,407 gross and \$797 net per mile. There has just appeared a report of the earnings of the Siberian Railroad, which, in 1899, were at the rate of \$3,162 gross per mile open, which was 13½ per cent.

more than the year before. The traffic must have included immense quantities of materials for construction, and more of these than this year, when such materials have entered chiefly by the Pacific terminus and had a comparatively short rail haul (470 miles) to the Amoor River. The monthly freight shipments were much the largest in December; the number of passengers greatest in October.

TECHNICAL.

Manufacturing and Business.

The Hawkinsville & Florida Southern is in the market for 56-lb. steel, new or first-class relaying, rails for about 30 miles of road. Address A. B. Steele, Vice-President and General Manager.

A. E. Kenney, for some time Assistant Secretary of the Ingersoll-Sergeant Drill Co., has recently opened an office at 39 Cortlandt street, New York City. He will make a specialty of compressed air installations.

Thomas P. Egan, President of the J. A. Fay & Egan Co., of Cincinnati, Ohio, has just returned from abroad after an absence of nearly five months. While in Europe he made an extended tour of England and the Continent, visiting all the company's agents. Mr. Egan also took an active interest in the company's exhibit of wood-working machinery at the Paris Exposition, where the grand prix, the highest award, was received.

Road & Co., 1215 Filbert street, Philadelphia, have issued a circular of interest to the mechanical department of railroads. The company maintains a bureau of engineering and inspection, giving special attention to machinery and locomotives and cars and other materials for railroads. It has a well-equipped chemical and physical laboratory at its command and is prepared to make promptly tests of all classes of material. The circular deals particularly with springs and lubricants, calling attention to the saving to be gained by a thorough inspection of these goods.

Iron and Steel.

C. O. Lindroth, Mechanical Engineer of the Cambria Steel Co., died at Johnstown, Pa., Oct. 17 of typhoid fever, aged 47.

Representatives of the Government of Holland have placed an order with the Carnegie Steel Co. for 12,000 tons of rails for use in Java.

Mr. John Price, representing the Great Southern & Western Ry. of Ireland, has placed a contract with the Maryland Steel Co. for 3,000 tons of rails for that road.

Seybold & Dickstey, of Sheffield, England, have, according to a Pittsburgh despatch, secured option on five acres of land near Wheeling, on which to build a crucible steel plant.

The International Iron & Steel Co., with a capital stock of \$3,000,000, was incorporated in New Jersey Oct. 20 by Wm. E. Hingston, Charles H. Tuttle and N. M. Collins.

The Vulcan Iron Works was incorporated in West Virginia last week with a capital of \$100,000. The company will operate foundries, boiler shops, etc., at Charleston, W. Va. The incorporators are: F. Woodman, E. Boiesue, M. Barton, G. Minsker, A. W. Hager, all of Charleston. Brown, Jackson & Knight are the attorneys, Charleston.

The Old Dominion Steel Works, of Reading, Pa., has been bought by Philadelphia capitalists, and the plant will hereafter be known as the Philadelphia Steel Co. Among those interested are Walter Steel, Aaron I. Sanson, Jr., and the following directors: D. F. Vaughn, Thomas U. Parker, James O. David and Daniel F. Halahan. The office will be in the Stephen Girard Bldg., Philadelphia.

The Secretary of the Navy has advertised for bids for building six armored cruisers, three of which will be sheathed and coppered. Bids will be opened in Washington on Dec. 7. The unsheathed vessels, if the Department's design is followed, will be about 502 ft. long, about 69 ft. 6 in. in breadth, about 13,400 tons displacement, and will draw about 26 ft. 6 in. They will have a coal capacity of 2,000 tons and a speed of not less than 22 knots.

A contract to build two large sea-going cargo steamers, with a carrying capacity of 12,000 tons each, and costing about \$700,000 each, has been let to the Maryland Steel Co. The Maryland Steel Co. is now building two steel freighters for the Boston Towboat Co.; three other steamers of over 11,000 capacity; three torpedo boat destroyers, a large floating steel dry dock for the United States Government, to be placed at Algiers, La.; a large steel barge for the Pennsylvania R. R., and two sea-going dredges for service in New York harbor.

Subjects for the M. C. B. Association.

The Committee on Subjects for the year 1901 requests each member of the Association to submit subjects which it is thought would be advisable to have investigated by committees during the coming year; also subjects for the five-minute topical discussions during the next convention. Send replies to S. Higgins, Superintendent Motive Power, Lehigh Valley Railroad Co., South Bethlehem, Pa., not later than January 1, 1901.

Locomotives and Cars in Cape Colony.

Consul-General Stowe sends from Cape Town, August 31, 1900, copy of a circular issued by a Rand firm to mining companies, saying that, in view of the scarcity of rolling stock, the director of railroads proposes the

purchase in England or elsewhere of fifteen 69-ton engines of similar pattern to those recently ordered by the Natal Government Railways, the cost to be about £4,000 (\$19,466) each; also of two hundred 30-ton flat-bottomed steel trucks with bottom openings, of a type suitable for the conveyance of general goods, to cost about £400 or £500 (\$1,946 or \$2,433) each.

Lignite and Oil as Fuel.

Continued experiments in the use of a mechanical mixture of lignite and petroleum have resulted in a constantly increasing use of this fuel for locomotives on the railroads of Roumania. Recently published statistics show that during three years, beginning with 1896, the use of petroleum increased from 2,200 tons to 15,200 tons; lignite from 17,200 tons to 67,000 tons. Improved methods of using this kind of fuel are said to have been adopted.

Interlocking.

The Boston & Maine has just completed a new interlocking plant at Bleachery, near Boston. The machine, which is of the Saxby & Farmer pattern, has 48 levers.

Center Plates and Side Bearings.

The M. C. B. committee on this subject has issued the following circular of inquiry:

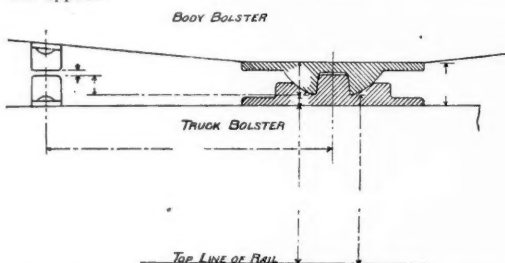
Please fill in dimensions on the blank and send blue prints of your standard center-plate and side bearings, advising number of freight and passenger cars on which this plate is used.

Are you using anti-friction side bearings on freight or passenger cars?

If so, what kind and what is your experience with them?

Have you experienced any trouble with flattening of balls or rollers?

Do you allow clearance when anti-friction side bearings are applied?



If so, how much, and do you think it desirable to maintain clearance?

Please give results of any experiments that you have made, showing relative resistance between cars with side bearings free and in contact, or showing reduction of resistance as between anti-friction side bearings and plain.

It has come to the knowledge of the committee that some such tests have been made by the different lines, and while they may not be elaborate, we would be glad to have results of any such tests.

Send replies to B. Haskell, Superintendent, M. P., Pere Marquette R. R., Saginaw, Mich.

The New York Shipbuilding Company's Yard at South Camden.

A little more than a year ago the New York Shipbuilding Company began work on its new yard at South Camden. The land rights cover 130 acres with a frontage of 3,600 ft. on the Delaware River. The river at this point has 40 ft. depth at low tide. The yard buildings are of structural steel and brick. Two slips, each to have a 100-ton traveling crane, are included in the covered structure and are large enough to accommodate the greatest work that can be foreseen. The permanent steel-laid launching ways will also be under cover. In all the great floor and overhead space of the shops, slips and ways there will be scarcely a square foot that is not directly served by one or several electrically driven traveling cranes. All shop tools, many of which are working now, are driven by independent electric motors. While the erection of structures is going on the yards are at work on three ships whose carrying capacities are 11,000 tons, 5,500 tons and 4,200 tons respectively. The largest of these, it may be noted, will exceed in rated carrying capacity the liner St. Paul. The new yards in their general plan, steel structural work, tool equipment and tool driving form a striking example of modern industrial organization.

Friction Draft Gear.

The Westinghouse friction draft gear will be used on 7,500 of the new freight cars recently ordered by the Baltimore & Ohio. This is the largest order so far placed for friction buffers. It is said that at least one-half the new locomotives now building will have Westinghouse draft gear at the rear of the tenders.

A Schenectady Engine on the Vandalia.

Mr. W. C. Arp, Superintendent of Motive Power of the Vandalia, writes giving some particulars of the performance of a Schenectady eight-wheel engine which was put in service by him on the 23rd of March last. This engine, being No. 177, is one of four passenger engines which the Schenectady Works built for the Vandalia in March. Mr. Arp states that the engine was in continuous service until August of this year and in that time made a total mileage of 165,013 miles without being taken into the shop for any but minor repairs. The belief is expressed that except for the fact that the engine was in an accident, immediately preceding its withdrawal from service in August, it would have run 200,000 miles before classified repairs were necessary. During the time mentioned the engine lost 29 trips. The cylinders are 20 x 26 in., and the driving wheels 78 in. diameter, the boiler pressure being 190 lbs. The total heating surface is 2,241 sq. ft., of which 175 is in the fire-box, and the grate area is 30 sq. ft. These engines carry 85,800 lbs. on the drivers and weigh 132,300 lbs. total.

Bids for Pumping Engines for Pittsburgh.

Director Wilson, of the Department of Public Works, Pittsburgh, Pa., opened bids Oct. 22 for two pumping engines of a capacity of 12,000,000 gallons per day for the Brilliant station. The bidders were the Wilson-Snyder Manufacturing Co., \$252,000; Henry R. Worthington, Brooklyn, N. Y., \$218,500, and Camden Iron Works, of Camden, N. J., \$237,500. Two months ago bids were submitted for pumps of 15,000,000 gallons capacity, on which the Snow Pump Co. bid \$350,000, and the Camden Iron Works \$272,000, but were rejected as being too high.

THE SCRAP HEAP.

Notes.

An Albany paper says that firemen on the New York Central have had their pay increased two mills a mile, and enginemen 25 cents a day.

To frustrate train robberies the Burlington road has made a standing offer of \$1,000 reward for capturing or killing a robber, and it is said that some of the trainmen will be armed.

Delegates from various railroad brotherhoods lately met at Binghamton, N. Y., to form a "legislative board" to work at Albany during the coming winter, but no formal action was taken. The matter will be again considered at Albany in January.

The use of hoops to deliver train orders to an engine-man or conductor without stopping the train, has been introduced on the Pittsburgh division of the Pittsburgh, Cincinnati, Chicago & St. Louis. This road is now double track for over 200 miles westward from Pittsburgh.

Traffic Notes.

On the application of a railroad company the United States Court at Jackson, Miss., has enjoined the Mississippi Railroad Commission from reducing the rates for the transportation of cotton seed in carloads.

The ferries of the Pennsylvania Railroad between Philadelphia and Camden having been called to account for lax observance of the law concerning the transportation of inflammable substances on boats, have issued an order prohibiting the carriage of loose hay, which, hitherto, farmers have taken to Philadelphia in large quantities on wagons.

The Queen & Crescent line announces improved and faster passenger service between the East and Texas by way of Meridian and Shreveport. From seven to 12 hours will be saved between important cities. The route is over the Sherman, Shreveport & Southern. Between Vicksburg and Shreveport dining cars will be run, in which meals will be served by the card.

A committee of the New York Produce Exchange has formulated rules, which will be offered for adoption in all the principal cities of the country, regulating the sale of grain and feed in carload lots. Among other things these rules say what shall be deemed a carload, as follows: Oats 1,500 bushels, corn 900, wheat and rye 800, barley 1,000, mill feed in sacks 40,000 lbs., in bulk 30,000 lbs.

Loading and Demurrage Regulations on the Great Northern.

General Superintendent F. E. Ward, of the Great Northern and Wilmar & Sioux Falls railroads has issued revised rules for the guidance of station agents in assigning cars to shippers and in collecting demurrage, which read substantially as follows:

On and after October 25 a charge will be made for all cars detained by shippers or consignees over 24 hours, when loading or unloading, of \$2 per car per day, except that 48 hours will be allowed for loading foreign cars with potatoes. This rule to apply at all stations east of the Terminal Despatch Association (St. Paul). Agents must give all possible assistance to expedite the loading and unloading of cars and explain to shippers and consignees that the Company charges demurrage only to secure service of the cars, and wishes to avoid the necessity for such a charge whenever possible. Demurrage charges must be strictly enforced, but if exceptional circumstances are such as to justify consideration of shippers' or consignees' claim for refund, agents will report all facts fully, with recommendation thereon.

Loading Freight.

So far as practicable cars will be distributed by the division superintendents between stations in proportion to the average daily shipment of grain from such stations. Application must be made to the station agent for cars and a record kept by him of the name of the applicant, the exact date and hour of application, stating when the cars will be required. Applications will be filled in their order as soon as cars can be furnished—one car to each applicant, afterwards cars in proportion to the amount of grain offered and awaiting shipment by each shipper.

Persons furnished with cars for loading must complete loading of same within 24 hours from time cars are set on the side track, ready for their use. Agents will notify shippers when cars are ready for loading, if practicable to do so, but applicants for cars must inform themselves and be prepared to load cars promptly when they are furnished. Agents must insist upon being furnished with full shipping directions before shippers commence loading. All unfilled orders for cars will expire by limitation at 6 p.m. on Saturday of each week, and the orders must be renewed.

Shippers must be notified of this regulation when filing orders. Agents are further instructed that the record kept by them, giving the detail of cars ordered must be carefully written up at the time order is received and shown to any shipper upon request. Agents will decline to receive orders for cars for any day from any shipper for a number of cars that is in excess of his (or their) capacity to load in one day. Agents must use diligence to ascertain whether persons ordering cars have freight within reasonable proximity to load the number of cars ordered. If the evidence is not sufficient they will be justified in declining to take car orders.

Unloading Freight.

Agents will notify consignees promptly, personally or by mail, of arrival of their freight, if practicable to do so. Cars loaded with property to be unloaded by the owner

must be unloaded within 24 hours after arrival at destination and being properly placed. If not, it will be at the option of the Company to unload them at expense and risk of owners, or to charge demurrage for each car.

Decision of Interstate Commerce Commission on Demurrage Charges.

The Interstate Commerce Commission in an opinion by Commissioner Clements has announced its decision in the case of the Pennsylvania Millers' State Association against the Philadelphia & Reading and other roads. The Commission holds in this case that 48 hours is an unreasonably small allowance of time for unloading where any portion of such time has to be consumed in attending to the necessary preliminaries. As to grain, flour, hay and feed deliverable at interior points in the territory of the Philadelphia Car Service Association, the carriers are required to cease and desist from charging demurrage until the expiration of a reasonable time for unloading after the cars have been placed for unloading and notice of such placing has been given to the consignee or other proper party. The Commission further holds that 48 hours is a reasonable time for the actual unloading. The Commission also decides that as storage is named in the law as a service in connection with transportation, the charges therefor are required to be reasonable and just; that the tariff, to be printed and posted, should state, among other terminal charges, the rules and regulations, if any, of the carrier in relation to storage.

Y. M. C. A. Conference at Philadelphia.

The Tenth International Conference of the Railroad Department of the Young Men's Christian Association was held in the Railroad Y. M. C. A. Building at Philadelphia Oct. 11, 12 and 13. Many railroad officers were present. A paper was read by Mr. B. D. Caldwell, of the Lackawanna, on "The Railroad Employee as a Man," and one by George B. Hodge, of New York, on the educational work of the Department. On Thursday evening Dr. Theodore L. Cuyler, of Brooklyn, was the chief speaker. On Friday evening an audience of 2,000 gathered to listen to an address by Vice-President John P. Green, of the Pennsylvania road. Among the persons on the platform were Miss Helen Gould, Mrs. Russell Sage, Ex-Gov. Beaver, Hon. L. S. Coffin, of Iowa; A. J. Cassatt, Charles E. Pugh, W. H. Baldwin, J. B. Garrett, N. P. Shortridge, Theodore Voorhees, W. H. Brown, Jefferson Justice, Joseph H. Crawford, Samuel Porcher, A. J. Gillingham, D. S. Newhall, Theodore N. Ely, George W. Stevens, W. A. Garrett, and C. D. Hammond.

Among the secretaries participating in the conference were Messrs. C. J. Hicks, E. L. Hamilton, M. C. Williams, John F. Moore, G. D. McDill, F. B. Shipp and F. S. Goodman. Other prominent Association men present were: Richard C. Morse, W. B. Miller, W. E. Lougee, H. O. Williams, C. M. Hobbs, Col. John J. McCook and L. C. Warner. There were also present Messrs. Reitlinger and Shillovski of Russia and Herr Paul Glasenapp of Germany.

On Monday, the 15th, 26 carloads of the delegates went to Atlantic City as the guests of the Pennsylvania Railroad Company, in three special trains. The party was in charge of Robert S. Beatty, assisted by Colonel Frank N. Barksdale and William B. Wilson, Superintendent of the Mantua Transfer. The road entertained the 1,000 visitors at dinner at eight hotels, viz.: Brighton, Dennis, Traymore, Shelburne, Windsor, Haddon Hall, Seaside and St. Charles.

Imports and Exports of Iron and Steel.

The following table, compiled from the monthly summary of the Bureau of Statistics of the Treasury Department, shows the leading articles of iron and steel and of iron ore imported into the United States in the first eight months of 1900, compared with the same period of 1899:

Imports—Gross tons.	Eight Months.	1899.	1900.
Pig iron	18,740	41,703	
Bar iron	12,811	12,963	
Steel ingots, billets, blooms, etc.	8,300	9,168	
Timber	38,062	45,100	
Wire rods, iron or steel	11,147	14,560	
Iron ore	371,291	637,302	
Manganese ore	94,318	226,355	

The following table shows our exports of leading articles of iron and steel and of iron ore in the first eight months of 1900, compared with the same months of 1899:

Exports—Gross tons.	Eight Months.	1899.	1900.
All other pig iron	177,342	120,696	
Scrap and old, for remanufacture	63,544	30,536	
Bar iron	8,368	4,808	
Band, hoop, or scroll iron	2,075	836	
Bars or rods of steel	23,000	37,697	
Billets, ingots, and blooms	24,578	30,618	
Cut nails and spikes	6,270	7,782	
Wire nails	20,083	21,956	
Steel plates and sheets	39,947	22,864	
Iron rails	5,260	4,703	
Steel rails	158,937	256,276	
Wire	74,939	55,247	
Steel wire rods	14,114	4,778	
Structural iron and steel	37,762	46,702	
Iron ore	15,673	20,767	
Locomotives, number	363	329	

Trade and Transportation in Guatemala.

The completed negotiations for the extension of the Guatemala Northern by the Central American Improvement Co., recently noted (Oct. 5, p. 659), have stimulated efforts for improved communication in the republic. Heretofore the principal American imports have come by the Pacific Mail Steamship Company's boats from San Francisco. Transportation on the Atlantic side via the Gulf of Mexico has been impossible owing to the lack of railroad facilities from El Rancho to Guatemala. This transportation will be supplied by the new railroad. The Pacific Coast transportation has been improved by a new German steamship company making closer connection with the United States via San Diego, Cal. This competition has caused a slight reduction in freight rates.

Fast Run on the Fort Wayne.

On September 30 passenger train No. 21, of the Pittsburgh, Ft. Wayne & Chicago, was run from Ft. Wayne to Chicago, 148 miles, in 3 hours 22 minutes, which is 1 hour 13 minutes less than the schedule time. The train was about an hour and a half late leaving Fort Wayne. It consisted of engine No. 283, Class X, and nine heavy cars. From Fort Wayne to Chicago the rate of speed, including stops, was 43.9 miles an hour; from Fort Wayne to Clarke Junction, 126 miles, it was 47.9, and, excluding stops, it was 52.1 miles an hour; from Plymouth to Valparaiso, 40.2 miles, the time was 46 minutes, equal to 52.4 miles an hour. From Valparaiso to Clarke Junction, 21.5 miles, the time was 23 minutes, equal to 56.3 miles an hour. The train arrived in Chicago only 14 minutes late.

Technical Schools.

Dartmouth College.—Mr. J. Shirley Eaton, Statistician of the Lehigh Valley Railroad Company, has been engaged to give a course of lectures during January before the students of the Tuck School of Dartmouth College upon the Theory and Practice of Railroad Statistics. Mr. Eaton is the son of General John Eaton, who was at one time United States Commissioner of Education. He was a member of the class of 1889 of Dartmouth College, but took his degree at Marietta College, where his father was president. He has since received the degree of M.A. from Dartmouth. He is well qualified by years of special experience in railroad accounting for the novel course of lectures which he is to undertake. The course will include a general discussion of railroad revenue and expenditure, followed by a detailed study of freight and ticket accounts and statistics, operating statistics, store requisitions, car accounting and the general books, such as balance sheet, various journals, side ledgers and accounts and reports of the superintendent's office and of the master mechanic and the division engineer.

Trend of Wages From 1891 to 1900.

In connection with the article in the July Bulletin of the Department entitled "Trusts and industrial combinations," there was given a table showing the rates of wages in various occupations for a period extending back in most cases from the present year to 1891. The data there shown comprise figures relative to the rates of wages paid in a large number of industries and occupations, and were secured directly from the pay rolls of establishments located in all sections of the country. It was found possible in the compilation of this summary to include data pertaining to 148 establishments, representing 26 industries and 192 occupations. The period covered includes the years from 1891 to 1900, and those items for which data for the whole period were not given were excluded from consideration in the summary. All the data included, except those for mining, relate to the manufacturing industries, the data relative to steam railroads and street railroads having been excluded from the summary. The results here given, showing the trend of wages from 1891 to 1900, are entirely fair and undoubtedly approximate very closely the actual conditions for the whole country. The table follows:

Year.	Relative wages.
1891	100.00
1892	100.36
1893	99.32
1894	98.06
1895	97.88
1896	97.93
1897	98.96
1898	98.79
1899	101.54
1900	103.43

In this table the average of the wages for 1891 is taken as the basis and, as will be seen, represents 100. The relative figures for each of the remaining years of the period are secured by dividing the average wages for 1891 into those for each of these years. The wages for 1892 and subsequent years consequently represent percentages of the wages for 1891.—Bulletin of the Department of Labor.

Collision on the Paris Underground.

The recently opened Metropolitan Underground Railroad of Paris had its first smash-up on the morning of October 19. Near the Place de la Concorde station a passenger train ran into the rear of a preceding passenger train, crushing the end of one car, shattering the windows of both trains, and injuring 29 persons, two of them fatally. The electric lights were extinguished, causing great excitement. It is said that the collision was due to disregard of the block signal rules. The foremost train, after reaching the station, was moved backward into the block section which it had just cleared, and while there was run into by the following train. The road is electric, and the block signals are worked by means of line wires; and in backing out of its own section the train passed over a track-treadle.

New Dry Docks in Vladivostok.

According to a report of Consul Smith from Moscow, the Russian Government has begun excavation for new dry docks in Vladivostok which will be capable of admitting ships 700 ft. long. Near the docks will be built two shipways capable of turning out ships up to 3,000 tons. The old dock is being rebuilt and six new boilers have been ordered. The Government has also decided to build and equip 60 new mechanical shops.

A New Railroad in Hayti.

The last legislative session of Hayti sanctioned a contract for a railroad from Port au Prince northeast about 50 miles to the Salt Lake. The American Vice-Consul General believes that the intention is to raise the funds in the United States. The concession is made to John Brenor Prophete and right of way is granted along the public highway. The state will grant a guaranty of 6 per cent. per year on the actual cost, not to exceed \$16,000 per kilometer (\$25,750 per mile), for which purpose it votes 5 cents gold on each 100 lbs. of the export dues on coffee. Definite plans must be submitted to the Secretary of State for Public Works within six months after the promulgation of the law, and building must be begun within nine months and completed within two years. The gage is 30 inches and the rails are 35 lbs. to the yard. Security of \$5,000 must be deposited by the concessioner.

New York Rapid Transit.

The Rapid Transit Commissioners have approved the form of a communication to the Municipal Assembly to secure a route for the Brooklyn extension of the underground railroad. The proposed Brooklyn-Manhattan road, from a point near the intersection of Whitehall and South streets in Manhattan, will go under the East River to Joralemon street, in Brooklyn; thence under Joralemon street to Fulton street, near Borough Hall; thence under Fulton street to Flatbush avenue, and under Flatbush avenue to Atlantic avenue, near the station of the Long Island Railroad. The cost, as the Board is advised, will not exceed about \$8,000,000.

American Car & Foundry Company.

The American Car & Foundry Company has issued a statement for the four months ending August 31 as follows:

Balance, April 31	\$3,698,648
Net earnings four months to August 31	2,002,743
Total	\$5,701,391
Preferred dividends (7 per cent. yearly)	1,034,075
Dividends on com'n stock (4 per cent. yearly)	292,450
Balance	\$4,371,866

LOCOMOTIVE BUILDING.

The Ashland & Wooster is having one engine built by H. K. Porter Co.

The Chicago, Great Western is about to order a number of locomotives.

The Colorado Midland, it is reported, will order five additional locomotives.

The Lehigh Valley is having 17 cars built by the American Car & Foundry Co.

F. C. Llano de Maipo is having one engine built by the Baldwin Locomotive Works.

The Mexican is having two engines built by the Pittsburgh Locomotive & Car Works.

The Michigan Central is having six locomotives built by the Schenectady Locomotive Works.

The Erie & Wyoming Valley is having four engines built by the Schenectady Locomotive Works.

The Sanyo, of Japan, placed the order with the Schenectady Locomotive Works for the eight locomotives which we noted in our issue of Oct. 12 were being built by that company for Japan.

The Chicago, Rock Island & Pacific has ordered 20 simple 10-wheel locomotives from the Brooks Locomotive Works, for April delivery. These engines will weigh about 165,000 lbs.; will have 20 x 28 in. cylinders and working steam pressure of 200 lbs. The diameter of the drivers will be 64½ in. Will have radial stay wagon top boilers, 329 charcoal iron tubes, 2 in. in diam. and 15 ft. long, steel fire-box 9 ft. 10 in. long and 3 ft. 4 in. wide; tank capacity will be 5,500 gal. and coal capacity 10 tons. Special equipment includes Westinghouse air-brakes, steel axles, Gallmar bell ringer, Janney coupler, Williams headlight, Simplex injector, Jerome packings, Ashton safety valve, Leach sanders, Nathan lubricators and American tires.

The Rio Grande Western order with the Schenectady Locomotive Works, referred to last week, calls for six mogul freight and four 10-wheel passenger engines, the former to be delivered between December and April next, and the latter between January and April next. The former will weigh 146,000 lbs., with 126,000 lbs. on the driving wheels, and have 20-in. x 26-in. cylinders; 61-in. driving wheels; extended wagon top boilers with 320 knobbled hammered charcoal iron tubes 2 in. in diam. and 12 ft. 3 in. long and a working steam pressure of 185 lbs.; fire-boxes, Carbon steel, 104 in. long and 41 in. wide, and a tender capacity for 5,000 gals. of water. The passenger engines will weigh 148,000 lbs., with 115,000 lbs. on the driving wheels, and have 19½-in. x 26-in. cylinders; 67-in. driving wheels; extended wagon top boilers with 312 knobbled hammered charcoal iron tubes 2 in. in diam. and 14 ft. long, and a working steam pressure of 185 lbs.; fire-boxes, Carbon steel, 108 in. long and 41 in. wide and a tender capacity for 5,000 gals. of water. The specifications for both types call for Westinghouse brakes, Tower pilot and tender couplers, Ohio injectors, Jerome piston and valve rod packings, Ashton safety valves, Leach sanding devices, Nathan lubricators, Ashcroft steam gages and Latrobe tires on all wheels. The passenger engines will have the Safety system of steam heat.

CAR BUILDING.

The Pere Marquette is reported in the market for 500 box cars.

The Evansville & Terre Haute is about to order 50 freight cars.

The Colorado Midland is asking bids on 100 stock cars of 60,000 lbs. capacity.

The Chicago, Milwaukee & St. Paul denies being in the market for 50 cars, as reported.

The Southern Pacific is having 15 passenger cars built by the Barney & Smith Car Co.

The Guatemala Central is having 14 passenger cars built by J. Hammond & Co., San Francisco.

The Atlanta & West Point has ordered 100 box, 25 coal and 25 flat cars from the Mount Vernon Car Mfg. Co.

Crerar, Clinch & Co., Chicago, have ordered 25 coal cars of 80,000 lbs. capacity from the Illinois Car & Equipment Co.

The Lake Shore & Michigan Southern has ordered 80 steel ballast cars of 100,000 lbs. capacity from the Pressed Steel Car Co.

The Texas Midland, we are officially informed, has not ordered 100 coal cars from the American Car & Foundry Co., as was reported last week.

The Pennsylvania is asking bids on 1,000 Class G L steel self-clearing gondola cars of 100,000 lbs. capacity. Reference to this proposed order was made last week.

The Florence & Cripple Creek, we are officially informed, has not ordered 125 box cars from the American Car & Foundry Co., as was reported last week, nor are they in the market for any equipment at present.

The Chicago, Rock Island & Pacific is building 250 wooden stock cars with wooden underframe in their shops at Horton. These cars will be 36 ft. 6 in. long, 8 ft. 9¾ in. wide and 7 ft. ¼ in. high. They will have hammered iron axles, Marden brake-beams, Janney couplers, Westinghouse air-brakes, chilled cast-iron wheels, Rock Island's standard trucks, Simplex body bolsters and Schoen truck bolsters.

The Norfolk & Western cars ordered from the Haskell & Barker Car Co. will be sand cars of 100,000 lbs. capacity and about 35,000 lbs. weight. They will be 40 ft. long and 9 ft. wide, of wood, with wood underframes. They will be equipped with steel axles, I-beam bolsters, N. & W. standard metal brake-beams, cast-iron brake-shoes, Westinghouse brakes, cast-iron journal-boxes, pressed steel journal box lids, N. & W. standard trucks and cast-iron wheels.

The Mexican Central, as noted in our issue of Oct. 5, has ordered 100 coal cars from the Pullman Co. They will be of 80,000 lbs. capacity, 33 ft. 7 in. in length, 9 ft. 8 in. in width, and 4 ft. 3¼ in. in height; will be of wood and have wooden underframe. Special equipment includes National Hollow brake-beams, cast-iron brake-shoes, American continuous draft rigging, cast-iron journal boxes and wheels, Scott springs, Sherwin Williams Mineral brown paint, Universal brasses, malleable iron lids and trucks.

The Baker, Whitely Coal Co. has placed an order with the Lebanon Mfg. Co. for 100 coal cars of 80,000 lbs.

capacity. They will weigh 32,000 lbs., will be 29 ft. long, 9½ ft. wide, 6 ft. high, will be of wood and metal construction, with wood underframes. They will be equipped with A. & P. Roberts Co. axles, Pressed Steel Car. Co. bolsters, National hollow brake-beams and brake adjusters, Graham draft rigging, cast-iron journal boxes with pressed steel journal box lids, Charles Scott Spring Co.'s springs, pressed steel P. R. R. standard trucks.

BRIDGE BUILDING.

ANDOVER, N. B.—The bridge over the St. Johns River, between this place and Perth, will be replaced by a new structure.

BALTIMORE, MD.—Specifications and plans for the joint bridge over the Patapsco River, at Avalon, between Howard and Baltimore Counties, have been submitted to the Howard County Commissioners. It will be 136½ ft. long and 16 ft. wide.

BARTERTON, OHIO.—We are informed that the Erie R. R. Co.'s Engineer at Galion, Ohio, is preparing plans for an overhead bridge at Cornell street to cost about \$35,000. The cost will be divided between the city and the Erie R. R. W. A. Wither, City Clerk. W. P. Kimball is the Erie R. R. Division Engineer at Galion.

BETHLEHEM, N. Y.—The Town Board of Bethlehem (Albany County), has applied to the State Board of Railroad Commissioners for authority to change the grade crossing of the Delaware & Hudson R. R. at the New Scotland plank road to an overhead crossing.

BLUE EARTH, MINN.—We are informed that there is no truth in the report that Faribault County will build a bridge over Blue Earth River. No bridge work will be done this year.

BOWLINGVILLE, OHIO.—The Commissioners of Clark and Champaign counties are considering building a bridge near this place.

BRISTOL, CONN.—The Bristol & Plainville Tramway Co., according to report, will build a bridge at Park street.

CINCINNATI, OHIO.—The following bids were received for rebuilding the Liberty street viaduct: Massillon Bridge Co., \$61,000; King Bridge Co., \$60,000; Illinois Bridge Co., \$68,000; Champion Bridge Co., \$54,900; Brackett Bridge Co., \$57,500; National Iron Bridge Co., \$64,000; Toledo Bridge Co., \$59,000; Lafayette Bridge Co., \$55,800. All rejected. New bids are wanted.

CLARION, PA.—The lowest bid for the State steel bridge over the Clarion River was that of the Owego Bridge Co., of Owego, N. Y., \$29,400.

CONNEAUT, OHIO.—The Ashtabula County Commissioners have been asked to build an \$80,000 bridge east of Conneaut.

DE QUEEN, ARK.—The Sevier County Court has appropriated \$10,000 for a bridge over the Cossatot at the ferry crossing.

DETROIT, MICH.—We are informed that the only bridges to be constructed the present season by the Grand Trunk, are at Deep River, Ind., one single span 65-ft. deck girder, and at Pine River, 10 miles west of Port Huron, Mich., where the company is building masonry for double track and will need two spans of 70 ft. each.

EL PASO, TEX.—A bridge on the Southern Pacific, six miles east of this place, gave way on Oct. 17 under a freight train.

FAIRMOUNT, W. VA.—Two bridges, one over the Monongahela River and the other over Buffalo Creek, will be needed on a branch line of the Baltimore & Ohio between Fairmount and Fairview, for which the contract was recently let to W. E. Howley & Co., Pittsburgh.

FALL RIVER, MASS.—City Engineer Philip D. Borden informs us that electric power will be used hereafter to operate the draw of the Taunton River bridge.

FLINT, MICH.—The Chicago & Grand Trunk Ry., we are informed, will need an overhead crossing of the Pere Marquette near Flint on a proposed extension.

FRANKLIN, PA.—It is announced that the Pennsylvania R. R. will build a bridge over the Allegheny River, for a connecting line from Sandy Lake to a point below Franklin.

FREDERICK, MD.—The Board of County Commissioners have been petitioned for a bridge over the Monocacy River at Stull's Ford.

Fritchton, IND.—The Knox County Commissioners and the Baltimore & Ohio Southwestern are reported considering building a bridge near this place.

GRAND RAPIDS, MICH.—We are informed that the Pere Marquette R. R. is arranging to rebuild, next spring, the bridge over Grand River at Grand Rapids.

HOUGHTON, MICH.—The Mineral Range R. R. will be crossed by the Houghton County street railroad by an overhead bridge on the line between Houghton and Calumet. The Railroad Commissioners have approved the plans.

LAWRENCE, MASS.—The Common Council has passed an order requesting the Mayor to have a bridge built over the Merrimack River at a point opposite the Essex County Truant School and North Andover.

LAWRENCEBURG, TENN.—An iron bridge has been ordered by the Lawrence County Court over Shoal Creek, one mile west of this place. Bids are being received, according to report.

MONESSEN, PA.—Plans for another bridge across the Monongahela River have, according to report, been sent to the Secretary of War for approval. A street railroad company is reported interested.

MONTREAL, QUE.—Plans have been made for the proposed elevation of the Grand Trunk tracks from the Bonaventure station to the city limits. The streets are to pass under the tracks by stone archways. The plans, which have been approved by the Grand Trunk, were made by Stuart Howard, of the Road Department.

MOUNT CARMEL, ILL.—A \$45,000 steel bridge is reported proposed over the Wabash River, and Paul Chipman is said to be interested.

MT. VERNON, OHIO.—The Mt. Vernon Bridge Co. was incorporated in Ohio, Oct. 20, by James Westwater and W. G. Westwater, of Columbus, and L. M. Walverton and James Israel, of Mt. Vernon. The capital stock is \$100,000. They will engage in bridge building.

NEW BEDFORD, MASS.—Plans have been submitted to the Harbor and Land Commissioners for the proposed Fairhaven bridge.

NEW HOPE, ALA.—The Madison County bridge across the Paint Rock River, near New Hope, will be changed into a drawbridge.

NEW YORK CITY.—The Municipal Assembly of New York City declined this week to authorize the issue of \$4,000,000 bonds for the New East River Bridge. This was on account of a quarrel in the Assembly and probably the issue will be authorized shortly.

A hearing was held, Oct. 23, before Major E. H. Ruffner, Corps of Engineers, U. S. A., on the New York Connecting Railroad bridge project. No objection was made and the plans will be forwarded to the War Department. The plans provide for a 800 ft. cantilever span, 30 ft. wide and 135 ft. above mean low water. Alfred P. Boller is the engineer. (Oct. 12, p. 679.)

The State Board of Railroad Commissioners has ordered an overhead crossing of the Long Island R. R., at Main Highway in Southampton, Suffolk County, known as the Gravel Hill crossing.

NORTH EASTON, MASS.—The Railroad Commissioners have ordered that the bridge on Main street, over the New York, New Haven & Hartford be made 5 ft. wider. The railroad will pay the cost.

OTTAWA, ONT.—The advisability of building a bridge over Bank street, Ottawa, to Hull, Que., is again under consideration. A bridge as proposed would cost about \$75,000.

The residents of Nepean Township have asked to have a viaduct built over the railroad tracks on Richmond Road.

Plans have been made by C. H. Keefer for a viaduct at Wellington street and for moving the Canadian Pacific tracks.

PHILADELPHIA, PA.—Architects Hale & Ballinger are reported to have finished plans, which may be seen at their office, for a large iron bridge to be built over the yard at the works of S. L. Allen & Co., at Fifth street and Glenwood avenue.

PITTSFIELD, MASS.—The Pittsfield Street Railway will build a bridge over the Housatonic River at South street. P. C. Dolan, Superintendent.

ST. JOSEPH, MICH.—We are informed that the Indiana, Illinois & Iowa R. R. has petitioned the State for permission to build a bridge across the St. Joseph River at St. Joseph.

ST. THOMAS, ONT.—Surveyors have been laying out the site for the proposed Lake Erie & Detroit River railroad bridge across the ravine south of this city. It will be 1,236 ft. long and the abutments will be built this fall.

SWAMPSCOTT, MASS.—A public hearing will soon be given in the matter of building an overhead bridge over the Boston & Maine on Essex street.

TRACY, CAL.—We are informed that plans will probably be adopted by the Board of County Surveyors, on Dec. 4, for the steel drawbridge over San Joaquin River at Dunham's Ferry. The draw will be 257 ft., and there will be two spans of 70 ft. each. F. E. Quail, County Engineer, Stockton, is making the plans.

WASHINGTON, D. C.—The District Commissioners have been asked to appropriate \$50,000 toward building a bridge across the Eastern Branch at the foot of First street, West. The bridge is estimated to cost, when finished, about \$250,000.

WHITE HAVEN, PA.—The County Commissioners, according to report, have ordered a bridge built over the Lehigh River.

WOODSDALE, OHIO.—The 600-ft. wooden bridge over the Miami River will probably be replaced by a steel structure costing \$30,000.

WYTHEVILLE, VA.—The Wythe County Supervisors have ordered an iron bridge built over Cripple Creek at Beverly Furnace.

Other Structures.

BLOOMINGTON, ILL.—The Chicago & Alton will, according to report, spend about \$300,000 during the next year in rebuilding and extending the shops at Bloomington. The plans include a new power, heating and lighting plant, new car shops and coaling station.

BUFFALO, N. Y.—The Lake Shore & Michigan Southern has let a contract to the MacDonald Engineering Co., of Chicago, for a 250,000 bushel grain elevator. The machinery in the elevator will be operated by electricity.

FRANKLIN, PA.—The Osborn Engineering Co., of Cleveland, Ohio, are the engineers for the buildings of the new plant of the Grant Tool Co.

MONTAUR JUNCTION, PA.—The Pittsburgh Coal Co. has let contracts for building car works at Montaur Junction on the Pittsburgh & Lake Erie, where it will make its own cars. The building will be put up by H. J. Bishop, of 124 Denniston avenue, Pittsburgh. The main building will be 60 x 300 ft. Other buildings will be an engine shed 45 x 125 ft.; a brick car repair shop, 50 x 300 ft.; power house, 35 x 60 ft.; two-story office building, 20 x 60 ft. Structural steel and corrugated iron will be used in construction.

NEW YORK, N. Y.—Proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until Nov. 21, for the excavation, foundation, basement wall and structural steel for the New York Custom House building. Mr. Cass Gilbert, 111 Fifth avenue, New York, is the architect. James Knox Taylor, Supervising Architect.

OAKLAND, CAL.—The United Engineering Works, of San Francisco, has bought 10 acres of marsh land on the Alameda side of the estuary upon which a ship yard will be built.

PAW PAW, MICH.—A roundhouse will be built at this place for the South Haven & Eastern R. R. Co. G. E. Drew, Chief Engineer.

PITTSBURGH, PA.—Jones & Laughlins, Ltd., announce that they are building, at their South Side plant, a rod mill, to have a capacity of 500 tons a day when working on heavy rods. It is expected to make the first rods by Jan. 1. The plant will cost about \$300,000. A contract for six reels has been let to Garrett & Cromwell, of Cleveland. The company expects to begin making Bessemer steel by using direct metal about Nov. 1. The hot metal bridge across the Monongahela river will soon be finished and over this iron from the Eliza blast furnaces on Second avenue opposite the South Side steel plant will be conveyed in ladle cars to the Bessemer converters.

PORTLAND, ORE.—Preliminary arrangements will be made this fall by the Northern Pacific Terminal Co. for large passenger car sheds to cover the tracks at the Union depot. The work will be done in the spring.

RACINE, WIS.—The Chicago & Northwestern will build a \$50,000 stone depot in this city next year to replace the present wooden structure. Plans and specifications have been made.

SAN FRANCISCO, CAL.—Of the 11 bids received Oct. 9 for the new dry dock at Hunter's Point, the lowest was \$402,000 by the City Street Improvement Co., San Francisco. The highest bid was \$450,000.

TACOMA, WASH.—The Northern Pacific, according to report, will build additional warehouses, coal bunkers and docks at Tacoma.

VALDOSTA, GA.—The Plant System, it is said, will build the proposed new depot at this place at once.

WACO, TEX.—Bids are being received by A. A. Allen, Vice-President and General Manager of the Missouri, Kansas & Texas, St. Louis, Mo., for a passenger station, one story high, 43 x 197 ft., at Jackson street, Waco. (Oct. 12, p. 679.)

WIARTON, ONT.—Joseph R. Roy, Acting Secretary of the Department of Public Works, Ottawa, Ont., will receive bids until Nov. 2 for building a wharf at this place. The plans may be seen at the office of H. A. Gray, in charge of Harbor and River Works for Ontario, Confederation Life Bldg., Toronto.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xi.)

Order of Railway Telegraphers.

This association held a convention at St. Louis, Oct. 16. Mr. M. M. Dolphin, of Kansas City, was elected President in place of W. V. Powell.

Canadian Society of Civil Engineers.

At the meeting, Thursday, October 25, a paper on "Road Construction and System of Control" was read by Mr. A. W. Campbell, M. Can. Soc. C. E.; discussion was held on Mr. E. Marceau's paper on "The Carillon Canal, Dam and Slide." The Council has decided to call the annual meeting for Thursday, January 24.

American Street Railway Association.

At the annual meeting of the American Street Railway Association in Kansas City, Mo., last week, Walton H. Holmes, of Kansas City, was elected President. H. H. Vreeland, President of the Metropolitan Street Railway, New York, and N. H. Heft, President of the Meriden Electric Railway, Meriden, Conn., were elected First and Second Vice-Presidents respectively. The members of the Executive Committee, which includes the President and Vice-Presidents, is as follows: John M. Roach, President of the Chicago Union Traction Co.; Frank L. Fuller, Wilkesbarre, Pa.; Geo. W. Baumhoff, St. Louis, Mo.; John R. Graham, Quincy, Mass., and John Harris, of Cincinnati, O. The next annual meeting will be held in New York City.

New York Railroad Club.

Last week we referred to the October meeting of the Club and stated that in the place of a regular paper, the topic "Why Has the Swing-beam Truck So Largely Been Abandoned for Freight Service?" was discussed. Among those who took part in the discussion were Messrs. R. H. Soule, George W. West, F. W. Brazier, M. N. Forney, L. R. Pomeroy and George L. Fowler. The conclusions to be reached from the discussion are that while the swing motion truck diminishes injurious motion in the superstructure of the car and causes less wear of wheels on curves, the rigid truck is preferable because of smaller cost for maintenance. At the conclusion Mr. M. N. Forney read a short article on "Possible Economies in Locomotives," which was followed by a short discussion.

Western Society of Engineers.

The Western Society of Engineers has issued the following programme of meetings to be held before the first of the year:

- Oct. 31—"Wireless Telegraphy," by W. S. Johnson, American Wireless Telegraph Co., Milwaukee, Wis.
- Nov. 7—"The River and Harbor of Chicago," by R. B. Wilcox, City Engineer's office.
- "The Robert A. Waller City Electric Lighting Plant," by E. B. Elliott, Chicago City Electrician.
- Nov. 21—"Modern Methods of Shop Practice in Bridge Construction," by W. H. Pratt, Universal Construction Co., Chicago.
- "The Shop and Laboratory in Relation to Engineering Education," by Paul M. Chamberlain, Lewis Institute, Chicago.
- Dec. 5—"Sanitary Engineering," by Prof. A. N. Talbot, University of Illinois.
- "The Design and Reconstruction of a Portion of the Glasgow Bridge Substructure," by H. P. Boardman, Chicago & Alton Railroad.
- "Rail-Top Culverts," by Albert Reichmann, Chicago, Milwaukee and St. Paul.
- Dec. 19—"Sewer Construction," by Guy Miltimore, City Engineer's office, Chicago.
- "Methods of Tunnel and Crib Construction in Chicago," by Paul G. Brown.

General Passenger Agents.

The annual meeting of the American Association of General Passenger and Ticket Agents was held at Buffalo, Oct. 16 and 17. The principal address was delivered by Mr. J. R. Wood, of the Pennsylvania. The election resulted in the choice of Mr. H. C. Townsend, of the Missouri Pacific, as President for the ensuing year, and it was voted that the next meeting should be held at Asheville, N. C.

President George H. Daniels, in opening the first session, made a happy address, alluding particularly to the good work which general passenger agents are doing in advertising American railroads throughout the world. Mr. Daniels was presented with a gavel made of wood from Palestine, the givers being Henry Gaze & Sons, the excursion agents.

The Committee on Anti-Scalping Legislation made a report recounting several successful prosecutions of ticket forgers during the past year. The Committee recommends the continuance of effort on the part of the railroads to secure anti-scalping legislation by Congress. The meeting again discussed the question of safety paper for joint tickets, and the date on which all roads should use the safety paper prescribed by the Association was changed to January, 1902. Over 78 per cent. of the railroads in the Association are already using this paper or have determined to use it.

The proposition to have an insurance department in the Association was laid over until next year, as were the questions of selling orders for tickets, the discontinuance of brass baggage checks, the issuance of rate sheets on May 1 and Nov. 1, standard method of printing time limits in round trip tickets, and several other subjects.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. S. E. Burke, Engineer Maintenance of Way of the Cleveland, Akron & Columbus (Pennsylvania Company) at Akron, Ohio, was accidentally killed Oct. 17.

—Mr. John Lott Nostrand died in Brooklyn, N. Y., Oct. 18, in the 71st year of his age. He practiced as a civil engineer and surveyor in Brooklyn from 1854 to his death. He was a charter member, a director and Chief Engineer of the original Brooklyn Elevated Railroad Company, but left the company before the completion of the structure. He had been identified in many ways with the growth of Brooklyn and he leaves a son, Mr. P. E. Nostrand, who is now a consulting civil engineer and City Surveyor in Brooklyn and a member of the American Society of Civil Engineers.

—We have already noted the appointment of Mr. Moses Williams as President of the Fitchburg R. R., now under lease to the Boston & Maine. Mr. Williams was born in Jamaica Plain, now a part of Boston, on Dec. 4, 1846. He has been a lawyer for 35 years, and had no railroad experience prior to his election as a director of the Fitchburg in the summer of 1899. He has served as a Representative in the Massachusetts Legislature and Selectman of the town of Brookline. For about 14 years following November, 1885, he was President of the Third National Bank of Boston.

—Mr. Leonard Goodwin, on Sept. 15, became General Superintendent of the Lehigh & New England at Penn Argy, Pa. He entered railroad service as apprentice machinist on Feb. 24, 1890, in the Southeastern shops of the Lehigh Valley, and continued with that company until his recent appointment. He served as rodman on the engineer corps from March 1, 1891; was in the General Superintendent's office at South Bethlehem, Pa., from Feb. 1, 1892; was in the Superintendent's office of the Lehigh Division and the Easton & Amboy R. R., at Easton, Pa., from Jan. 20, 1893; Assistant Trainmaster of the Lehigh Division from April 20, 1894, and Trainmaster of the Elmira & Cortland Branch, Auburn Division, from June 1, 1896.

—Mr. Richard Bell, Secretary of the Amalgamated Society of Railway Servants, who has figured prominently in the English newspapers, for the last few weeks, as the leader of the men who threatened to strike on the Taft Vale and Northeastern railroads, has been elected a member of the British Parliament. He is a representative of Derby. Mr. Bell has been General Secretary of the Employees' Society since the retirement of Mr. Harford, in 1897. He is 41 years old. He entered the railroad service on the Great Western in 1876 and was successively office boy, porter, brakeman and head guard. He was appointed a local secretary in the Brotherhood in 1886. He resigned from the railroad service in 1891, and in 1893 he became an organizing secretary.

—Mr. J. L. Welch, on Oct. 1, became Superintendent of the South & North Alabama and the Birmingham Mineral lines of the Louisville & Nashville, at Birmingham, Ala. Mr. Welch was born Oct. 20, 1854, at Louisville, Ky. He began his railroad work at 18 as freight brakeman on the Jeffersonville, Madison & Indianapolis, now the Louisville Division of the Pittsburgh, Cincinnati, Chicago & St. Louis. After serving as freight conductor, he was appointed Assistant Yardmaster in the Louisville yards in 1877. With the exception of three months at Nashville during this present year, his service has been continually at Birmingham as General Yardmaster from January, 1885, and later as Trainmaster, Assistant Superintendent and Superintendent with the Louisville & Nashville. He was Trainmaster, from January, 1889; Assistant Superintendent from January, 1897. He held a similar position on the Nashville & Decatur Division and the Nashville, Florence & Sheffield, at Nashville, Tenn., from July 1 this year until his recent appointment.

—Mr. Erasmus Gest, who recently resigned as Vice-President and Manager of the Nevada-California-Oregon, was born in Cincinnati, O., April 12, 1820. He entered railroad service in 1847 as Chief Engineer of the Little Miami, then became Chief Engineer in charge of surveys on the Ohio & Mississippi, between Cincinnati and St. Louis. Prior to 1847 he was engaged in large engineering work, principally on canals in Indiana, Pennsylvania and Ohio. In July, 1856, he was President and Superintendent of the Cincinnati, Wilmington & Zanesville and one year later Receiver for the same road. Mr. Gest resigned in 1859, but again became President of the reorganized road, then known as the Cincinnati & Zanesville, and held the position of President and later Receiver, until the road was bought by the Pennsylvania in 1869. He was employed in building street railroads and similar work until 1887, when he became Manager and Chief Engineer of the Nevada-California-Oregon, from which company he has just resigned as Vice-President and Manager.

—Mr. H. V. Harris, General Manager of the Midland Ry. Co. of Nova Scotia, was born in Devonport, England, Jan. 16, 1857. He went to Montreal, Canada, with his parents in October, 1867, and entered railroad service with the Grand Trunk on Feb. 7, 1870, and continued with that company in clerical capacities until September, 1878. For the following five years he was with the Louisville & Nashville as Chief Clerk to the General Manager, and then for three years Assistant to the General Manager of the Texas & St. Louis, now the St. Louis Southwestern. He served for one year as Purchasing Agent and Assistant Superintendent of the St. Louis, Kansas City & Colorado during its building. Then for three years as Purchasing Agent and Assistant to the General Manager of the Louisville Southern. For two years he was with the Louisville Terminal, first as Superintendent and later as Receiver. Two years additional were spent as Fuel Agent and Chief Clerk to the General Superintendent of the Chesapeake, Ohio & Southwestern, and for the past five years Mr. Harris has been General Manager of the Breckenridge Cannel Coal Co., and of the Breckenridge Short Line, both mines and railroad being now abandoned. His present company's line was built this year.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—D. D. Bailey has been transferred as Superintendent of the Rio Grande Division. J. F. McNally has been appointed Assistant Superintendent of the same Division. George E. Ayer, heretofore Assistant Division Superintendent at San Marcial, N. Mex., has been appointed Superintendent of the Pan Handle Division, with headquarters at Wellington, Kan., succeeding H. A. Tice, transferred.

Atlanta & West Point.—J. F. Hanson has been elected a Director, succeeding H. M. Comer, deceased.

Bangor & Aroostook.—Franklin W. Cram, Vice-President and General Manager, has been elected President, succeeding Albert A. Burleigh, who in turn was elected Vice-President. Mr. Cram will continue to discharge the duties of General Manager. This change was at the request of Mr. Burleigh.

Cleveland Terminal & Valley.—At a meeting of the stockholders C. W. Walford was elected Secretary.

Colorado Midland.—W. F. Bailey, General Passenger Agent at Denver, Colo., has resigned.

Dubuque & Sioux City (Illinois Central).—At a meeting of the stockholders E. C. Woodruff was elected Second Vice-President; J. F. Merry, Secretary; J. F. Titus, Treasurer, and J. T. Harahan, General Manager.

El River.—Elijah Smith has been elected President.

Eureka & Klamath River.—H. L. Walden has been appointed General Freight and Passenger Agent.

Findlay, Fort Wayne & Western.—Frank R. Garrison, heretofore Assistant to the General Freight and Passenger Agent, has been appointed Acting General Freight and Passenger Agent, succeeding Frank Finney, resigned, effective Nov. 1. Alexander Strausz, Jr., who has been Acting Auditor since Dec. 20, 1899, has been appointed Auditor, effective Nov. 1.

Gulf & Interstate.—H. S. Spangler, having taken charge of this property as Receiver, will personally superintend all department matters, until reconstruction has been accomplished and the line opened for through traffic again.

Louisville & Nashville.—C. L. Stone, heretofore General Passenger Agent of the Chicago & Eastern Illinois, has been appointed General Passenger Agent of the L. & N.

Missouri, Kansas & Texas.—W. W. Miller has been appointed Assistant General Freight Agent, with headquarters at Chicago, Ill., a position recently created.

National Tehuantepec.—E. C. Buchanan, Auditor, having resigned, J. R. Hunter has been appointed Acting Auditor.

Nevada-California-Oregon.—Thomas F. Dunaway has been elected Vice-President and General Manager, succeeding E. Gest, resigned.

New York & Ottawa.—The completion of the bridge over the St. Lawrence River between Cornwall, Ont., and Hogansburg, N. Y., has enabled the Ottawa & New York and the N. Y. & O. to be operated as one line, to be known as the New York & Ottawa, with the following officers with headquarters at Ottawa, Ont., in charge: G. B. Colpas, Auditor; G. H. Phillips, General Freight and Passenger Agent; G. A. Brown, Assistant General Freight Agent; H. K. Gays, Assistant General Passenger Agent; M. G. DeShaw, Superintendent; M. Keefe, Roadmaster; and M. Goodrich, Master Mechanic, at Santa Clara, N. Y.

Oceanic Steamship.—E. F. Burnett, heretofore General Eastern Passenger Agent of the Atchison, Topeka & Santa Fe, has been appointed General Eastern Agent of the O. S. and the American & Australian Line, with headquarters at 427 Broadway, New York City.

St. Louis & San Francisco.—J. H. Mace, Superintendent of the St. Louis Division, having resigned, the jurisdiction of A. O'Hara, Division Superintendent at Springfield, Mo., has been extended over that Division.

St. Louis, Troy & Eastern.—Beriah Warren has been appointed General Superintendent.

Shediac & Coast.—A. B. Copp has been elected Vice-President (See R. R. Construction column, Aug. 31, p. 588.)

Tennessee Central.—At a meeting of the stockholders N. C. Chapman was elected First Vice-President; E. F. Goltra, Second Vice-President, and E. A. Fallhaber, Treasurer.

Toledo, St. Louis & Western.—B. R. Stephens, heretofore with the Ohio Southern, has been put in charge of the Purchasing Department of the T., St. L. & W., succeeding N. McKinnon, who has been appointed Claim and Tax Agent.

Union Pacific.—T. M. Schumacher has been appointed General Freight Agent.

Washington & Gettysburg.—The officers of this company referred to in the Construction column, are: President, Gen. George H. Harries; Vice-President, S. W. Woodward; Secretary and Treasurer, B. H. Barker; General Counsel, John B. Lerner.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ABERDEEN & ASHEBORO.—Grading is about one-quarter completed on the branch from West End, N. C., to Jackson Springs, five miles. Forty men are at work. (Oct. 5, p. 661.) The building is being done by the company. (Official.)

ALABAMA ROADS.—A communication from the office of General Russell A. Alger, Detroit, states that there is no truth in the report that he is interested in building a railroad from Foshie, Ala., south about 50 miles to Pensacola, Fla. A small piece of road is to be built to the Louisville & Nashville to haul logs to that road. (Oct. 19, p. 696.)

ALPENA & WESTERN.—This company has been organized, with a capital stock of \$1,000,000, to build a railroad in the Southern Peninsula of Michigan from Alpena west across the state about 100 miles via Hillman, Atlanta, Gaylord and Mancelona to Bellaire. It is stated that the road is to be ultimately extended to Traverse City and Frankfort. M. Durand, of Ann Arbor, is President. Building is to be begun between Alpena and Hillman next spring.

AMERICAN-MEXICAN PACIFIC.—The company has let a contract to Wm. C. Bradbury & Co., of Denver, Colo., for 65 miles of this line from Tucson, Ariz., south to Calabasas, connecting with the Sonora line of the Southern Pacific. (Aug. 10, p. 545.) Lyman Bridges, of Tucson, is Chief Engineer and General Manager. (Official.)

BRIDGE RAILROAD COMPANY OF TOLEDO.—This company was incorporated in Ohio Oct. 18, with a capital stock of \$25,000, to build a line connecting the Toledo Bridge Company's new plant with the Cincinnati, Hamilton & Dayton and other lines of Toledo. The incorporators are: James A. Huston, E. B. Smith, C. L. Gates, E. B. Breckenridge and C. W. Johnston.

CALVERT, WACO & BRAZOS VALLEY.—Surveys are reported in progress for a further extension from Bryan, Tex., southwest about 30 miles to Navasota. The company is building from Lewis south 24½ miles to Bryan. The International & Great Northern is back of the project.

CHATEAUGUAY & NORTHERN.—This company has received a charter to build from Montreal to Joliette, on the Great Northern, 36 miles.

CINCINNATI INTERURBAN.—This company was incorporated in Ohio, Oct. 20, with a capital stock of \$10,000, to build a railroad, probably steam, from Cincinnati north about 20 miles to Hamilton. The incorporators are: Powel Crosley, Chas. T. McCrean, David M. Hunt, Wm. F. Hart and John C. Rogers, of Cincinnati.

CLEVELAND, LORAIN & WHEELING.—With reference to reported extensive improvements on this line, an officer writes that they are just finishing two grade reductions between Lorain and Medina, Ohio, covering about six miles of road. This is about all the special improvements being put into the property.

COLUMBIA VALLEY.—Maps of location and survey have been filed with the U. S. Land Office at Vancouver, Wash., for this proposed line from Wallula, Wash., west along the north bank of the Columbia to Ilwaco. L. Gerlinger, of Vancouver, Wash., President of the Vancouver, Portland & Yakima, is President. (Construction Supplement, July 27, 1900.)

DETROIT & LIMA NORTHERN.—Judge Thompson, at Toledo, has authorized the receivers to build the extension from Lima Junction, Ohio, to South Adrian Junction, eight miles. An issue of \$74,000 of receivers' certificates was authorized some time ago. (Aug. 3, p. 531.)

FORT WAYNE & BUTLER.—Cedar Creek Township has granted a subsidy of \$10,000 for this new line from Fort Wayne, Ind., northeast about 28 miles to Butler. The Wabash is interested. (Construction Supplement, July 27, 1900.)

GEORGIA PINE.—Building is to be begun at an early date, according to report, on the proposed extension from Bainbridge, Ga., southeast about 40 miles to Tallahassee, Fla. (Aug. 31, p. 588.)

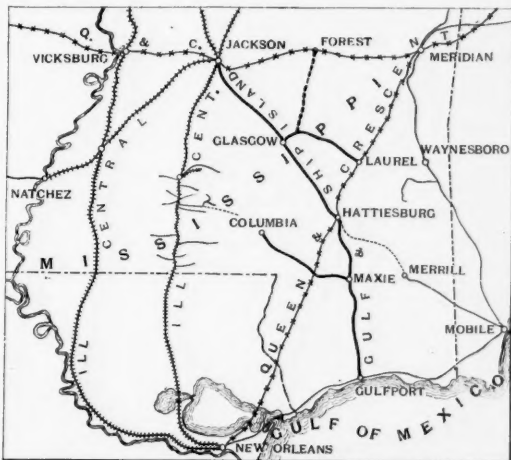
GRAND RAPIDS, HOLLAND & LAKE MICHIGAN.—Grading was begun, Oct. 22, on this line from Grand Rapids, Mich., southwest about 25 miles to Holland. The company expects to complete the grading this fall. John Winter, of Detroit, Mich., is President, and Benjamin S. Hanchett, Jr., Grand Rapids, Vice-President. (Sept. 21, p. 628.)

GRAND TRUNK.—Locating surveys are in progress for the Ottawa, Brockville & St. Lawrence line from Brockville, Ont., north about 60 miles via Carleton, Greenville and Leeds counties to Ottawa. (Oct. 12, p. 680.)

An officer confirms the report that the company is building an extension to Meaford Harbor, Ont. (Oct. 19, p. 696.)

GREAT NORTHERN.—A paper published at Everett, Wash., quotes a statement by an officer of this company that at least seven miles of freight tracks must be built at once within that city, besides other improvements.

GULF & SHIP ISLAND.—Trains began running last month on the completed extensions and branches of the Gulf & Ship Island R. R. The company now operates 252.9 miles of railroad, all in Mississippi. The main line runs from Gulfport, on the Gulf of Mexico, north 70.1 miles to Hattiesburg, and thence northwest 89.6 miles to Jackson, in all 159.7 miles. There is a branch from Maxie, 43.9 miles above Gulfport, northwest 47.3 miles to Columbia; another branch from Saratoga, which is a new station 49.8 miles southeast of Jackson, runs southeast 41 miles to Laurel on the Queen & Crescent Route. A short stub runs from Gulfport east 4.9 miles along the coast to Handsboro. At Jackson the main line connects with the Illinois Central main line from New Orleans north and with the east and west line of the Queen & Crescent. At Gulfport connection is made with the Louisville & Nashville line from New Orleans to Mobile. The Columbia branch cross the Queen & Crescent at Lumberton. Another branch to a Queen & Crescent connection at Forest, east of Jackson, is proposed from the Laurel branch a few miles east of Saratoga, to run north about 35 miles through Raleigh. The charter for the Gulf & Ship Island was granted by the Mississippi Legislature Feb. 24, 1882, and the original intention was to build not to Jackson, Miss., but to Jackson, Tenn.,



Completed Lines of the Gulf & Ship Island.

about 380 miles. The first section built was from Pontotoc north 37 miles to Ripley. This was completed in June, 1887, and leased to the Ship Island, Ripley & Kentucky. Two years later the completed lines of both companies passed under the control of the Gulf & Chicago and the above section is now included in the mileage of the Gulf & Ship Island. The first 20 miles of the present main line from Gulfport north was opened in 1890. A Receiver was appointed Aug. 16, 1892, and the road was not operated for several years. On Jan. 1, 1897, the company again took possession of its property and about two years ago the road was opened to Hattiesburg, and the recent additions carry it to Jackson. In June, 1899, the company bought the Laurel & Northwestern, which was built from Laurel to a point near Leaf River, 16 miles, and has completed it to its connection with the main line, thus forming the Laurel branch. The branch to Columbia has been built under the title of the Columbia, Lumberton & Gulf. The entire line is standard gage and is laid with 56 and 62-lb. rails. The company has a land grant of about 150,000 acres along its line. The

capital stock is \$1,400,000. In 1897 there was issued \$1,050,000 of first mortgage 5's limited to the section between Gulfport and Hattiesburg. Additional general mortgage 5 per cent. gold bonds to the amount of \$3,500,000, are to be issued on the remaining mileage. On June 30, 1899, there was \$633,966 outstanding in car trusts.

HALIFAX & YARMOUTH.—Building is to be resumed, according to report, next summer on the extension from Barrington Passage, N. S., toward Halifax. (Construction Supplement, July 27, 1900.)

HAWKINSVILLE & FLORIDA SOUTHERN.—This line is to be extended from Pitts, Ga., north about 30 miles to Hawkinsville. Preliminary surveys are made and locating surveys are in progress. The building will be done with free labor under the supervision of the company's Superintendent. (Oct. 12, p. 680.) The maximum grades are 1½ per cent.; the maximum grades 4 deg. (Official.)

ILLINOIS CENTRAL.—Work is reported begun on five miles of additional track at Jackson, Miss. (Aug. 3, p. 532.) The company is also said to be building six miles of track for yards at Teahula, Miss.

JACKSON, COLUMBUS & NORTHEASTERN.—A survey is ordered for this line from Jackson, Miss., northeast about 100 miles to Columbus. Newman Cayce, of Columbus, Miss., is President. (Sept. 28, p. 644.)

LAKE SHORE & MICHIGAN SOUTHERN.—An ordinance is being prepared in the Council of Chicago to compel the company to depress its tracks on Fortieth street between Wabash and Langley avenues.

LIME ROCK.—The company has petitioned the Railroad Commissioners for permission to build a branch to the O. P. Ulmer lime quarries. The company owns 11.3 miles in and around Rockland, Me.

LINDSAY, BOBCAYGEON & PONTYPOOL.—Location is being made under Mr. W. T. Jennings, C. E., of Toronto, for this line from Burketon, Ont., on the C. P. R., via Lindsay, 40 miles. Building is to be begun under James McDougall. (Construction Supplement, July 27, 1900.)

LOUISIANA ROADS.—The Salmen Brick & Lumber Co. is reported building a logging road from Bayou Liberty to Bayou Lacomb.

MARIETTA, COLUMBUS & CLEVELAND.—This company was incorporated in Ohio, Oct. 23, with a capital stock of \$250,000, to build a railroad from Marietta northwest through Palos to Columbus, paralleling the Toledo & Ohio Central and thence northeast to Cleveland, paralleling the Cleveland, Cincinnati, Chicago & St. Louis.

MARION & RYE VALLEY.—Surveys have been made for the proposed extension from Currin Valley, Va., to Rye Valley. (Construction Supplement, July 27, 1900.)

MARQUETTE & SOUTHEASTERN.—The State Crossing Board has approved the map for this proposed line from Marquette, Mich., southeast about 25 miles. It is stated that building is to be begun this season. It is to be built in the interest of the Cleveland-Cliffs Iron Co., of Cleveland, Ohio. Wm. G. Mather, of Cleveland, is President and Treasurer, and H. R. Harris, Marquette, General Manager. (Oct. 19, p. 696.)

MICHIGAN ROADS.—Right of way has been secured from Ann Arbor, Mich., west about 35 miles through the towns of Baxter, Grass Lake, Chelsea, etc., to Jackson, for an electric line. The company is not yet formed. Some grading will probably be done this fall. S. F. Angus, of Detroit, Mich., will build the road. (Official.)

MILWAUKEE & SUPERIOR.—See Railroad News column.

MONTANA ROADS.—Articles of incorporation have been drawn for a company, with a capital stock of \$4,000,000, to build a railroad from Billings on the Northern Pacific and the Chicago, Burlington & Quincy, to run northwest about 200 miles to Great Falls on the Great Northern. It is stated that the motive power will be electricity. The projectors are: James McNaughton, former general counsel for the Northern Pacific Railroad; State Treasurer T. E. Collins, and J. R. Havens.

NORTHERN PACIFIC.—Sealed proposals are asked on four miles of track for the Seattle & International from Everett, Wash., north toward Everett Junction.

OREGON RAILROAD & NAVIGATION.—A proposition has been made by the company to the Portland (Ore.) Board of Trade for the proposed spur north down the Willamette River to St. Johns. (Construction Supplement, July 27, 1900.)

PECOS VALLEY & NORTHEASTERN.—Building is to be begun very soon, according to report, on the proposed extension from Miller, N. Mex., southwest about 150 miles to El Paso, Tex. (Construction Supplement, July 27, 1900.)

PEMISCOT SOUTHERN.—Building is to be completed within 30 days on this line in Mississippi from Pascola, Pemiscot County, south 20 miles to a point on the Arkansas State Line. (Oct. 12, p. 680.) The line is being built by Houck's Missouri & Arkansas. (Official.)

PENNSYLVANIA.—Plans are reported completed for a bridge over the Allegheny River below Franklin, Pa., for a connecting line for the Western New York & Pennsylvania between Stoneboro and Oil City. The company now has trackage rights over the Lake Shore & Michigan Southern between these points. The Allegheny Valley tracks will be used to Franklin and about 17 miles additional line must be built.

PHILADELPHIA & READING.—An officer writes that so far as his company is concerned there are no plans under preparation for a branch, as reported, from Burleigh, N. J., southeast to Holly Beach. (Oct. 19, p. 696.)

PHILIPPINE ROADS.—Captain Chas. W. Mead, of the Thirty-sixth Infantry, U. S. A., has been ordered to take charge of a prospecting party for the proposed railroad from Dagupan, on the Island of Luzon, terminus of the Manila & Dagupan R. R., to run northeast to Baguio in the neighboring Province of Benguet.

PITTSBURGH & WESTERN.—An officer writes that undoubtedly considerable improvements will be made on the P. & W., but that the studies are not yet completed nor the plans prepared.

PITTSBURGH, SHAWMUT & NORTHERN.—The Warren-Burnham Co., 81 Fulton street, New York, has taken a contract for building the line from Bolivar, N. Y., north 26 miles to Angelica. (Construction Supplement, July 27, 1900.)

POTEAU VALLEY.—This company was incorporated in Oklahoma, Oct. 15, with a capital stock of \$1,000,000, to build a railroad from Fort Smith, Ark., west about 250 miles via Suttle in the Choctaw Nation, and South McAlester, to Guthrie, Okla. T. The Directors are: D. H. Hays, St. Louis; W. W. Sylvester, Kansas City; Horace Speed, Guthrie, Okla. T.; George J. Baer, Kansas City, and W. R. Thurmond, Kansas City.

ST. LOUIS SOUTHWESTERN.—Surveys are reported in progress for an extension from Gatesville, Tex., northwest about 30 miles to Hamilton.

SAN ANTONIO, LLANO & NORTHERN.—Citizens of Palo Pinto, Tex., have offered this company \$20,000 toward building its proposed line from San Antonio north via Llano to Strawn and Palo Pinto. Geo. W. Angle, of Austin, Tex., is General Manager. (Aug. 3, p. 531.)

SEABOARD AIR LINE.—Application has been made to the Secretary of State of South Carolina for a charter for a road from McBee, on the S. A. L., about 18 miles southwest of Cheraw, to run north about 40 miles to Monroe, N. C., on another branch. The S. A. L. is said to be back of the project.

SEBASTICOOK & MOOSEHEAD.—An officer confirms the statement that the company will build from Hartland, Me., to Mainstream this fall, and contracts are let to E. T. Mitchell. (Oct. 5, p. 662.)

SOUTHERN MISSOURI & ARKANSAS.—A new offer has been made to the people of Poplar Bluff, Mo., for an extension from Puxico southwest about 15 miles to that city. The proposition made some time ago was not accepted. (Construction Supplement, July 27, 1900.)

STATESBORO & REGISTER.—This company has been organized in Georgia to build a line from Statesboro west seven miles to Register. Charles G. Douglas, of Washington, D. C., and F. T. Lockhart are interested.

STRATHROY & WESTERN COUNTIES.—Mr. W. T. Jennings, C. E., of Toronto, Ont., is locating this line which is to run from St. Thomas to Strathroy, on the C. P. R., and northwest about 50 miles. It is stated that building is to be begun at once. (Construction Supplement, July 27, 1900.)

WASHINGTON & GETTYSBURG.—A suit brought by Baltimore people against the officers of this company for its charter has been dismissed in the courts of the District of Columbia. Charters have been granted in Pennsylvania and Maryland for the line from Washington, D. C., north about 72 miles to Gettysburg, Pa. It will probably touch at Sligo, Avenel, Burnt Mills, White Oak, Colesville and Sandy Spring, Md. Under the charter the motive power in the District of Columbia is to be electric. The original intention was to use the same power over the whole line, but steam may be used outside of the District. The officers and directors are given under Elections and Appointments.

WEST VIRGINIA SHORT LINE.—Preliminary surveys are reported completed for an extension from Clarksburg, W. Va., southeast about 35 miles to Belington, on the West Virginia Central & Pittsburgh.

YELLOWSTONE PARK.—This company was incorporated in New Jersey, Oct. 18, with a capital stock of \$2,000,000, to build railroads through Yellowstone Park. The incorporators are: Alex. Harrison, of Hackensack; D. E. Everitt, of Jersey City; J. B. Clark, of Hoboken; F. A. Hall, of Livingston, Mon.; and C. E. Barrett, of Indianapolis, Ind.

GENERAL RAILROAD NEWS.

CHICAGO & ALTON.—Holders of C. & A. purchase money certificates, issued by the U. S. Trust Co., New York, under the syndicate agreement of March 2, 1899, are notified that they may receive the securities and cash to which they are entitled on and after Oct. 25, upon surrender of the same to the Trust Co. in New York. Under this distribution it is stated that for each \$1,000 subscribed there will be paid \$375 in 3 per cent. bonds, \$500 in 5½ per cent. bonds, \$400 in preferred stock, \$250 in common stock and \$10 in cash.

CHICAGO, BURLINGTON & QUINCY.—Stockholders of 19 subordinate railroads met at Burlington, Iowa, Oct. 22, and voted to sell all their property to the parent company. The stockholders of the C. B. & Q. will meet in Chicago, Nov. 10, to ratify the purchase. Similar absorptions of subordinate lines are proposed in other states. The roads are as follows: Chicago, Burlington & Kansas City; Clarinda, College Springs & Southwestern; Creston & Northern; Fairfield & Ottumwa; Hastings & Avoca; Chillicothe & Charleston; Burlington & Missouri River; Creston branch of the Burlington & Missouri River; Keokuk & St. Paul; Leon, Mount Ayr & Southwestern; Nebraska City, Sidney & Northeastern; Western Iowa; Albia, Knoxville & Des Moines; Brownville & Nodaway Valley; Chariton, Des Moines & Southern; Des Moines & Knoxville; Humeston & Shenandoah; Murray & Creston, and Red Oak & Atlantic. (Sept. 14, p. 614.)

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—In the year ending June 30 the gross earnings were \$5,124,000, an increase of \$433,000, but operating expenses increased \$566,000, and the net decreased \$163,000. Of the increase in operating expenses a considerable part is due to "maintenance of way and structures" for improvements required under the terms of the lease. Another considerable part, however, was due to higher prices for labor and material. Many improvements must be made to comply with the lease. The cost of these is estimated at about \$120,000 a year on the unexpired term of the lease. There will be also an increase of \$160,000 a year in the rental to be paid, "which places a serious burden upon the company for the remainder of the lease period."

DENISON & SHERMAN.—The stockholders, on Dec. 6, will vote on the proposition to issue \$300,000 bonds.

DETROIT & LIMA NORTHERN.—Judge Thompson, in the U. S. Circuit Court, at Cincinnati, Ohio, has confirmed the sale of the Columbus Northwestern to W. B. Strang, Jr., New York, and Chas. M. Haskell, of Ottawa, Ohio, bought Sept. 21. (Sept. 28, p. 644.)

ENSLEY SOUTHERN.—This company, which is building a line for the Southern Ry., has filed a mortgage to the Standard Trust Co., New York, as trustee, to secure \$900,000 of 4 per cent. bonds, due 1925. (Southern, Construction Supplement, July 27, 1900.)

KANSAS CITY SUBURBAN BELT.—Securities valued at \$500,000 were to have been sold at Kansas City, Mo., Oct. 23, to satisfy a judgment of \$100,000 secured by the Cambria Steel Co. An application by the Provident Life & Trust Co., Philadelphia, delayed the sale. The hearing on the application will be before Judge Phillips, Nov. 5. (Sept. 14, p. 614.)

LAKE ERIE & DETROIT RIVER.—The company has offered to renew the lease of the London & Port Stanley line between those points at the rate of \$14,000 per year for the remainder of the lease, and for \$15,000 for an extension. The London & Port Stanley has made a counter proposition for \$20,000 until the ex-

piration of the present lease, and \$25,000 every year for 16 years thereafter.

MILWAUKEE & SUPERIOR.—This line extending from Granville, Wis., on the Chicago, Milwaukee & St. Paul, west 20 miles to North Lake, has been bought by the Chicago, Milwaukee & St. Paul. It is stated that the St. Paul will extend the line further westward. The road has been operated chiefly for freight.

MOBILE & OHIO.—The annual report for the year ended June 30 last shows an increase of 188.5 miles in the system. This is the new Montgomery Division consisting of the main line to Montgomery, 167.2 miles, and the Warrior and Blockton branches, 9.5 and 11.8 miles respectively. All were incorporated into the system July 1, 1899. The gross earnings this year were \$5,996,731 on the additional mileage, against \$4,531,153 last year, a gain of \$1,465,578. The net earnings were \$1,756,273, against \$1,451,631 last year, an increase of \$304,642. Of the gains in gross and net, \$764,895 and \$141,067 respectively came from the old lines exclusive of the Montgomery Division. Operating expenses on the entire line took 69.58 per cent. of the gross earnings this year against 65.03 per cent. last year and 65.91 per cent. in 1898. Of the increase in operating expenses, \$24,069 is accounted for in increased rail renewal and \$42,274 in additional expenditures for ties, bridges, buildings, fixtures and repairs incidental to the floods of the latter part of the year. During the past three years the company has bought 20,757 tons of new rail, all charged to operating expenses. Maintenance of roadway and structures cost \$1,018 per mile this year against \$916 in 1899. The increased cost of maintenance of equipment and of conducting transportation have been mainly due to increase in the volume of business. The freight-ton mileage on the old line this year was 707,322,820, and on the Montgomery Division 63,128,157, a total gain of 200,335,284 ton-miles over last year. The local business was seriously diminished by the unprecedented rainfall and disastrous floods which at one time covered nearly 200 miles of track. The Government reports at the Mobile Station showed a rainfall during the three months of April, May and June this year of 43.98 in. against only 7.79 in. last year and an average of 15.29 in. for 30 years. The net additions of equipment for the year are 26 engines, one passenger car, 714 freight and 54 construction cars.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The suit to annul the lease of the Memphis & Paducah to the N. C. & St. L., entered some time ago, was withdrawn in the U. S. Court at Nashville, Tenn., Oct. 18. The stockholders of the leasing company ratified the lease at their recent annual meeting. (Sept. 21, p. 628.)

NEW ORLEANS & WESTERN.—Judge Parlange, in the U. S. Circuit Court at New Orleans, La., Oct. 12, reduced the upset price on the sale of this property from \$1,000,000 to \$100,000, upon application of the mortgage trustee. The purchaser must, however, in addition, assume all the receiver's certificates, all debts and obligations of the receivership, all pending claims, compensation of the receiver, trustee, etc. The sale is to take place Nov. 17. At the sale on Oct. 6 no bid was made. (Oct. 12, p. 680.)

NEW YORK, PHILADELPHIA & NORFOLK.—The company, on Nov. 1, will pay 2 per cent. interest on the income bonds, which makes 4 per cent. for the year.

OTTAWA & GATINEAU.—Arrangements are being completed for the amalgamation of this company and the Pontiac Pacific Junction. The two companies are building lines to join near Hull, whence they will cross the bridge of the Interprovincial Bridge Co. into Ottawa.

PENNSYLVANIA.—The Schuylkill & Juniata has made a consolidated mortgage to John P. Green and John C. Sims, as trustees, to secure \$12,000,000 bonds. Of this issue \$4,350,000 will be reserved to retire existing bonds at maturity, and \$5,000,000 will be issued to replace a like amount of underlying bonds of the Pennsylvania & Schuylkill Valley, owned by the Pennsylvania R. R. Co.

ST. LOUIS SOUTHWESTERN.—Albert Loeb & Co., New York, announce on behalf of a majority of the shareholders that stockholders who will furnish them with names and addresses, together with the number of shares held by them, will be fully informed as to the steps to be taken for the further interests of the property. The object of the protective measures is said not to be to remove Mr. Edwin Gould from the Presidency but to make sure that he does not enter into a lease of the road to some other company in which he is interested, unless such steps seem advisable to a majority of the stockholders.

SOUTHWESTERN OF GEORGIA.—The suit of R. M. Farrar against this company is expected to come up for trial at the November term of the Bibb Superior Court. In his petition the plaintiff states that when the reorganization of the Central of Georgia took effect, the Southwestern received \$865,183 in compromise of the unpaid rentals which fell due during the receivership. Of this sum \$519,000 was paid as a dividend to stockholders on Dec. 24, 1895; \$270,000 in fees, commissions, etc., and \$83,000 set aside as a reserve fund. The petitioner claims that this was an illegal division as the money belonged to the owners of stocks, not only in 1895, but at similar dates from 1892 to 1895 inclusive. According to the terms of the lease, the rental was to be paid yearly in June and December, directly to the stockholders and not to the company itself.

TENNESSEE CENTRAL.—A contract agreement is reported signed for both freight and passenger business between this new company and the Nashville, Chattanooga & St. Louis and the Nashville & Knoxville.

TERRE HAUTE & INDIANAPOLIS.—Judge Carter, in the Superior Court at Indianapolis, Ind., Oct. 18, handed down an opinion in the suit of the State of Indiana against the company, holding that the state is entitled to recover \$745,154.65 as its share of the profits of the company since its organization under a special charter in 1847. The claims of the state were for about \$3,000,000. The suit is of long standing.

TOLEDO & OHIO CENTRAL EXTENSION.—This property was sold, Oct. 15, to R. C. Martin, 52 Broadway, New York, for \$200,000, the upset price. The sale was under the foreclosure of the Marietta Mineral bonds, of the underlying mortgage for \$650,000, and of the extension mortgage under which \$850,000 bonds has been issued. There is outstanding about \$850,000 receivers' certificates and floating debt. The receiver was appointed in November, 1893.

UNION PACIFIC.—Howard Abbott, Special Master in Chancery of the old company, has paid the last dividend amounting to about \$1,000,000 to the unsecured creditors, which practically closes the receivership. (June 1, p. 364.)